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Annual Meeting Issue

SOCIETY OF AMERICAN FORESTERS 1900

Volume 54
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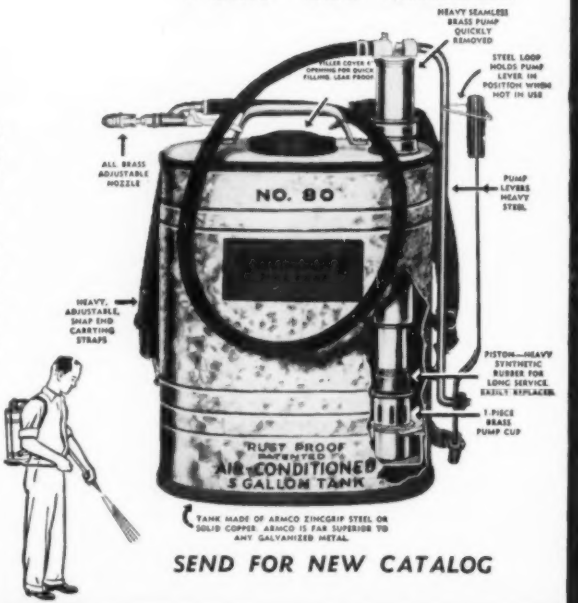
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COVER: Long Island Sports Arena under construction. Laminated arches with a clear span of 205 feet are made of southern pine.

Photo courtesy of A.F.P.I.

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Journal of Forestry

Official Organ of the Society of American Foresters

The Progress and Problems of Southern Forestry

Editorial

IT DOES a man's heart good to contemplate the vital, wide-spread operation that forestry has become in the South today. To old timers, long atuned to a slower tempo, its rapid development seems nothing less than marvelous, a dream come true.

In this prosperous year of 1956 the forests of the South, from the Potomac to the Brazos, are more fully utilized, are in better shape for continued growth and usefulness and are more important in the economy of the region than perhaps ever before in history.

The practice of on-the-ground forestry has become a commonplace thing, almost as much a part of the southern scene as cotton growing or coon hunting. Professional foresters have been accepted as working brothers in the family of forest industries, and together with those in government services and teaching number well into the thousands. Forest research is having to hustle to meet the pressing demand for the latest in techniques; the experiment stations are no longer ten years ahead of the foresters-in-boots.

What has brought about this remarkable development in the South? Foresters over the years have of course exerted a powerful influence in educating southern landowners and the general public, and have pioneered the basic techniques of good forest practice. But the forest situation today, I venture to say, would have been but little better than that of 25 years ago if foresters had not received a powerful assist due to a timely and remarkable change in the economic climate. The true answer to the question lies in the industrialization of the South.

The South has been traditionally agrarian since colonial days. But the passage of time found the farms dwindled in size, with soils washed thin and more and more needful of expensive fertilization. The purchasing power of the population was sinking lower in the national scale.

During this period which lasted well into the first quarter of the century, forestry for the typical timberland owner was not a practicable thing. In the forest industries prices were low, profits small, and risks appalling. As a result, stumpage values were, as we look back at them now, pitifully little. The outlook justified little interest in holding land for continuous cropping.

The industrialization of the region began with the great southward movement of the cotton textile industry early in the century. More and more other manufacturers, too, came to process the region's rich mineral deposits. The growth of manufacturing had a markedly vitalizing effect on the general economy, but, except for some relief of the pressure of poor farmers on pale soil, thus freeing a large area of abandoned fields for tree growing, and an improved local market for lumber from a more prosperous people, there was but little effect on the forestry situation.

Then a new movement of industry came about, to start a surge in forestry that persists to this day. In the early 1930's the pulp and paper makers of the nation discovered the South as a field for expansion. In the past 25 years pulpmill installation has grown to 72 plants with more under construction or announced. The capital investment in mills and timberland reserves now exceeds a billion dollars—all new money. These plants currently consume more than 18 million cords of wood annually, or 60 percent of the domestic pulpwood receipts of all mills in the United States.

The impact of this massive development on southern forestry has been felt in every part of the region, and in many ways, all stimulating. The new industry has purchased around ten million acres of timberland, almost entirely from owners who had no intention of practicing forest management, and has put this area under the care of professional foresters for continuous production.

This ownership, sizable as it may seem, supplies only a part of the annual requirement; 80 percent of the 18 million cords of wood used annually is purchased in the open market. Consequently, owners, large and small, all through the South now have a large and steady market at profitable prices for their second growth pine. This happy circumstance has opened an entirely new outlook for the considerable number of large sawmill operators that survive the cut-out-and-quit era. The new cash income from the great volume of wood that must inevitably be grown, and was formerly sacrificed, in the long process of producing sawlogs is now available to meet taxes and protection and management costs. Furthermore, the periodic removal of the smaller trees promises to

shorten the process and improve the end product. Long-time forest management for poles, piles, pulpwood, and sawlogs is rapidly becoming the order of the day among the larger lumbermen.

Farmers and other small landowners, who together own 70 percent of the region's forest land, are awakening to the fact that there is value and profit in their woodlands and a growing number of them are planting abandoned fields to pine and applying conservative cutting practices to their woods.

So, for this reason or that, the value of timber and timberland has risen ten times or more above the World War I level and has brought about an equal increase in participation in timber growing as a business.

The recently completed Timber Resource Review states that the South has 193 million acres of commercial forest land, upon which the net annual increment of growing stock is 6,800 million cubic feet. The yearly timber cut is 5,000 million cubic feet, leaving an annual surplus of 1,800 million feet. At long last the South's forest increment is significantly greater than its annual cut—in other words, the growing stock is increasing in volume, and in value, each year.

This surplus looks good on paper—but in the light of what the future probably holds for us, it is far from adequate. The Stanford Research Institute's report "America's Demand for Wood 1929-1975" predicts that the South must bear the brunt in meeting the expected increase of demand for pulp and paper products. By 1975 the present southern pulpwood cut of 18 million cords, it says, must be expanded to around 27 million. And this is to be accomplished without denying to other manufacturers of forest products their full share of the annual increment.

Meeting this greatly increased wood requirement without reducing growing stock is southern forestry's number one problem.

The approach to success will require:

1. Securing wider adoption of forestry practices by the small owners who control nearly 70 percent of the forest land and who have been slow in accepting such practices.

2. Reducing the annual losses by fire, insects and disease.

3. Developing new and larger market outlets for second growth and inferior hardwoods, especially in pulp making.

4. Controlling the spread of inferior hardwoods to cut-over pine lands.

None of these problems is insoluble. Climate and soil are favorable, big business and the universal urge of the profit motive are implacable, foresters are in the saddle and riding hard, and stubborn research is not to be denied. There can be no doubt that, God willing, our 193 million acre forest will reach the goal set for it, with some to spare.

Truly the golden years of southern forestry lie ahead!

INMAN F. ELDREDGE, SR.

The President's Column

This is the Annual Meeting issue of the JOURNAL. At this meetng we salute the South—that part of the country which is making the greatest "comeback" in wood production and forestry that has ever been experienced. The South is demonstrating what can be accomplished when science, forestry, and management team up. The timber resources of the South have been the contributing factor in one of the greatest industrial revolutions of our time. In addition, this development has pointed the way for other industries to help meet the needs of our expanding economy.

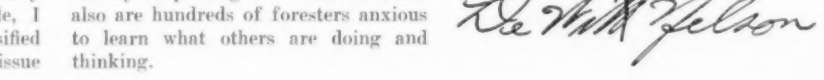
The impact of forestry—the development of new techniques and methods in management, harvesting, and utilization—is being reflected in many allied industries. As an example, I call your attention to the diversified and interesting advertising in this issue of the JOURNAL. Our advertisers recognize the field of forestry as an important outlet for their products.

This JOURNAL will probably be more thoroughly read than most issues. Therefore, I wish to comment on the type of articles which we receive for publication in the JOURNAL. Some practicing foresters complain that too many of the articles report the findings of researchers on specific subjects, and that we should have more articles dealing with practical problems of management and operation.

We expect 1,000 foresters at this meeting, the great majority of whom are professional practitioners. These men have much to offer for they are men who have developed ideas and methods that have proven profitable in their areas and that may be useful or adaptable in other areas and in other timber types. Here are hundreds of foresters who have something worthy of passing on to others. Here also are hundreds of foresters anxious to learn what others are doing and thinking.

Why don't we receive articles from these men? They are all well qualified and most of them can write short articles interestingly. They also are the men asking for more articles on topics with greater universal appeal.

After talking with many on this subject I have come to the conclusion that there is one main reason for this lack. The average Mr. Practicing Forester is anxious for the other fellow to produce the material, but is unwilling to exercise the necessary effort to do the job himself. I suggest that each Section chairman make a project of providing two articles from practicing foresters of his Section for the JOURNAL during the next year. Let us continue to make greater and greater use of our professional magazine for the exchange of professional knowledge and information.



The South's Forest Resource

P. R. Wheeler
and J. W. Cruikshank[1]
Forest Service,
U. S. Department of Agriculture

SOUTHERN FORESTS today supply nearly half of the nation's annual timber output. When the old growth in the West is gone, the South[2] will assume an even greater role in the nation's timber economy. The South already has passed through the difficult transition period from dependence on virgin timber to widespread use of second growth. If recent encouraging forestry trends are continued and accelerated, wood-using industries can confidently expect a continuous and increasing supply of southern timber.

TABLE 1.—AREA OF FOREST LAND IN THE SOUTH, 1953

State	Total	Commercial	Productive but reserved	Unproductive	Total land area in commercial forest
	Thousand acres				*Percent*
Alabama	20,771	20,756	5	10	63.5
Arkansas	19,346	19,292	51	3	57.2
Florida	23,047	21,519	74	1,454	62.0
Georgia	24,057	23,969	18	70	64.0
Louisiana	15,990	15,899	84	7	55.0
Mississippi	16,473	16,440	33	...	54.4
North Carolina	19,513	18,976	335	202	60.4
Oklahoma (east)	6,027	5,257	20	750	53.7
South Carolina	11,943	11,891	49	3	61.3
Tennessee	12,558	12,301	257	...	46.0
Texas (east)	11,708	11,703	5	...	62.8
Virginia	15,832	15,285	284	263	59.9
Total South	197,265	193,288	1,215	2,762	58.7

Area and Ownership

After more than 300 years of settlement and development, forests still occupy the largest part of the South's land area. Some 59 percent, or 197 million acres out of a total 329 million, are forest land (Table 1). Cropland in farms makes up 63 million acres, or less than one-third of the timber area. The remainder is in pasture, range, towns, and roads.

A small part of the forest—about 4 million acres—is considered noncommercial, either because it is extremely low in productivity or because it is in some form of public ownership that reserves the timber from cutting. Public and private lands suitable for commercial timber production amount to 193 million acres. This is 40 percent of the total of such land in the United States. In all southern states except Tennessee, over half the land is classified as commercial forest.

The bulk of the commercial forest is privately owned (Table 2). A notable feature of land ownership in the region is the immense number of small tracts held by thousands of individuals. About 75 percent of the privately owned forest land is in holdings of less than 5,000 acres and most of it is in tracts of less than 500 acres. With such an ownership pattern, it is apparent that the decisions of small woodland owners have an important influence upon the timber resource.

As of 1953, more than 46 percent of the commercial forest acreage in the South was in farm ownership, 16 percent was held by the lumber and pulp industries, 29 percent was owned by other private interests, and less than 9 percent was in public ownership. These proportions vary widely from state to state.

TABLE 2.—COMMERCIAL FOREST LAND AREA BY OWNERSHIP CLASS, 1953

Ownership class	Area	
	Thousand acres	*Percent*
Federally owned or managed:		
National forest	10,372	5.4
Indian	117	Negl.
Bureau of Land Management	154	.1
Other	3,553	1.8
Total	14,196	7.3
State	1,857	1.0
County and Municipal	626	.3
Private:		
Farm	90,143	46.6
Lumber manufacturer	18,517	9.6
Pulp manufacturer	12,188	6.3
Other	55,761	28.9
Total	176,609	91.4
All ownerships	193,288	100.0

[1]P. R. Wheeler is chief of the Division of Forest Economics at the Southern Forest Experiment Station, New Orleans, La. Before his untimely death on May 9, 1956, J. W. Cruikshank held a parallel position at the Southeastern Forest Experiment Station, Asheville, N. C.

[2]As used here the "South" includes Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, Louisiana, and the timbered eastern portions of Texas and Oklahoma.

Major Forest Types

Within the South are several major subregions characterized by distinctive physiographic features and forest growth. Bordering the Atlantic and Gulf coasts from South Carolina to east Texas is the longleaf-slash pine forest (Fig. 1). It grows on the sandy soils of the lower Coastal Plain. West of the Mississippi River, natural slash pine drops out of the type. Altogether, there are over 26 million acres of longleaf-slash pine forest, of which nearly half is in Florida.

In the Carolinas and Virginia, loblolly pine is the predominant species in the Coastal Plain. Shortleaf leads in the Piedmont. Virginia pine spreads across the foothills of the Appalachians.

The rolling hills of Georgia, Alabama, Mississippi, Louisiana, and Texas support a mixed loblolly-shortleaf pine-hardwood forest. Southwestern Arkansas runs heavily to loblolly pine in mixture with hardwoods, but in the mountains the forest is chiefly shortleaf pine and various species of hardwoods. Shortleaf pine is also scattered through parts of Tennessee. All told, there are some 75 million acres of this loblolly-shortleaf pine-hardwood forest, exclusive of the millions of acres of pure upland hardwood stands that occur within its borders.

The 54 million acres of upland hardwoods in the South fall into three main categories: the Appalachian hardwoods, the central hardwoods of Tennessee and northwestern Arkansas, and the upland hardwoods within the southern pine region.

The Appalachian forest, in the mountains of western North Carolina and Virginia and the eastern portions of Tennessee, is the most diversified in the United States; it is a transition zone where characteristically southern species meet and intermingle with species whose greatest occurrence is farther north. All together, there are about 140 native species, of which 60 are commercially important. Included are the spruce, white pine, birch, and hard maple common to the Northeast; the basswood, buckeye, and walnut of the Central States; and the yellow pine and blackgum of the Southeast.

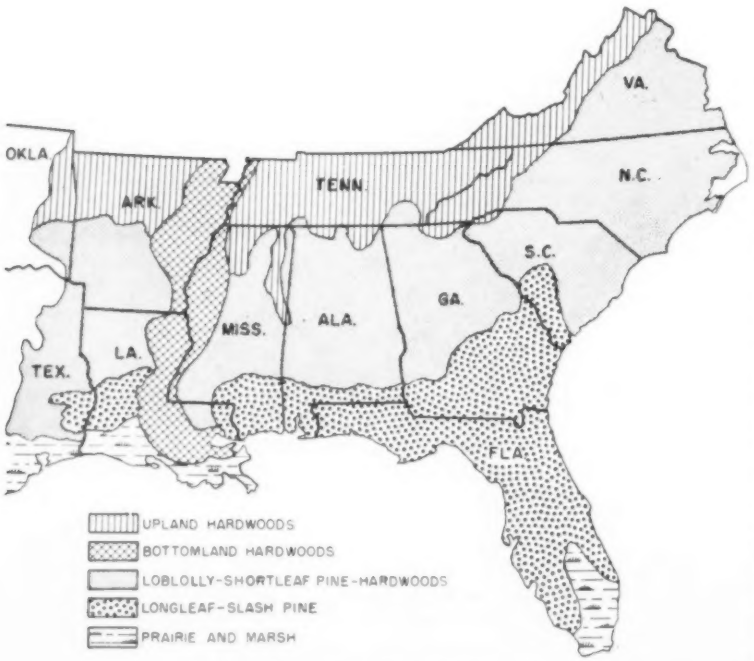


FIG. 1.—Major forest types in the South.

In the central hardwood region of Tennessee and northwestern Arkansas, oak and hickory make up the bulk of the forest. Originally this area contained an abundant supply of white oak, walnut, and other prized species. But the stands have been heavily picked over. At present they contain much poor-quality timber.

Throughout the shortleaf and loblolly pine forest, and to some extent in the longleaf-slash pine belt, stands of upland hardwoods break up the continuity of the pine. In part, they represent a climax hardwood type characteristic of certain localities and in part they represent the residual stand left after the pine has been cut from mixed pine-hardwood forests. In certain parts of the longleaf-slash pine belt, such as the sandhills of South Carolina and the clearcut barrens from Florida to east Texas, turkey oaks and other scrub oaks predominate. In general, this hardwood is of little value.

Of much greater utility are the 37 million acres of hardwoods and cypress on the flood plains of the Mississippi River and along major waterways throughout the South. The Mississippi Delta alone has about 9 million acres that contain a large part of the nation's supply of high-quality hardwood. Half of this land and timber is in Louisiana.

These southern bottomlands support a rich variety of hardwoods. Sweetgum is the most common. Water oak and willow oak are abundant. Stands of hackberry, elm, and ash are often residual after sweetgum and water oaks are removed. Cottonwood and willow are found along river margins—sycamore, pecan, and elm enter in transition to sweetgum and water oak. Extensive tracts of overcup oak and bitter pecan are typical of backwater parts of the Delta. Tupelo gum occurs in the swamps, bays, and along the lower reaches of the larger rivers. It is particularly abundant in North Carolina and Louisiana. Cypress, most plentiful in Florida and Louisiana, is

the only important softwood.

Condition of the Forest

In the South as a whole, roughly 15 percent of the forest land was supporting old-growth timber in the mid-1930's, when the first Forest Survey of the region was made. The better part of this remaining old growth has since been harvested.

At present, some 30 percent of the forest land supports saw timber stands, most of them from 40 to 80 years of age. Louisiana has the largest amount, over 7 million acres. Alabama, Arkansas, Georgia, and North Carolina each have over 6 million. This extensive area of merchantable timber places these states among the leaders in the production of lumber.

Most of the forest, however, is in stands below saw timber volume—i.e., less than 1,500 board feet per acre, International ¼-inch log rule. Pole timber stands make up 40 percent of the forest area, seedling and sapling stands 20 percent, and nonstocked and other areas less than 10 percent. Broadly speaking, most young-growth areas have sufficient stocking to develop into merchantable stands, though current yields may be much less than can be obtained through intensive management.

Volume of Saw Timber

The South has some 357 billion board feet in saw timber trees—i.e., softwoods at least 9 inches in d.b.h., hardwoods at least 11 inches. About 47 percent of this volume is pine; 4 percent is other softwoods; and 49 percent is hardwood. Louisiana and North Carolina, with over 40 billion board feet each, have the largest total volume of saw timber (Table 3).

Loblolly and shortleaf pine are by far the leading softwoods. They make up nearly 121 billion board feet (Table 4). The South owes its present position as a timber-producing region to these two species, which have restocked cutover lands and abandoned fields from the Potomac to the plains of Texas. Longleaf no longer dominates the extensive acreage it once did: the virtual denuding of many original stands, the species' infrequent seed crops, and the depredations of woods hogs and needle blight have interfered with longleaf restocking. Slash pine has a restricted botanical range and is even less abundant. Together, longleaf and slash pine amount to some 37 billion board feet.

Numerous species make up the hardwood saw timber volume, but as a group the oaks predominate. The total stand of oak is 72 billion board feet, but a considerable part of it consists of low-value species. For example, four-fifths of the volume in white oak species in the Delta is overcup oak, which is little used in normal times. Though sweetgum is abundant, only a small part of its saw timber volume is in the old growth known in the trade as redgum. Tupelo and blackgum rank close to sweetgum in total volume. But here again, the usable board-foot volume is much less than the total, because a great deal of the upland blackgum is of little value.

The rather large volume of saw timber in each state tends to mask the fact that volume per acre is

TABLE 3.—VOLUME OF TIMBER ON COMMERCIAL FOREST LAND, 1953

State	Growing stock			Saw timber		
	Total	Softwood	Hardwood	Total	Softwood	Hardwood
	Billion cubic feet			*Billion board feet*		
Alabama	11.7	5.6	6.1	38.2	21.9	16.3
Arkansas	11.8	4.3	7.5	38.3	17.8	20.5
Florida	8.2	6.0	2.2	23.0	18.0	5.0
Georgia	12.7	7.8	4.9	36.9	23.1	13.8
Louisiana	11.2	3.9	7.3	41.4	18.2	23.2
Mississippi	9.6	3.3	6.3	25.8	11.1	14.7
North Carolina	13.6	6.4	7.2	44.2	22.5	21.7
Oklahoma (east)	1.8	.6	1.2	5.6	2.2	3.4
South Carolina	9.6	5.3	4.3	32.3	18.9	13.4
Tennessee	5.8	.9	4.9	15.4	2.6	12.8
Texas (east)	7.2	3.8	3.4	25.6	16.8	8.8
Virginia	10.5	3.2	7.3	30.4	9.8	20.6
Total South	113.7	51.1	62.6	357.1	182.9	174.2

TABLE 4.—NET VOLUME OF SAW TIMBER ON COMMERCIAL FOREST LAND, 1953[1]

Species	Saw timber	
	Million board feet	*Percent*
Softwoods:		
Shortleaf and loblolly pines	120,752	33.8
Longleaf and slash pines	36,638	10.3
Other southern yellow pines	10,075	2.8
Cypress	12,402	3.5
Other softwoods	3,066	.8
Total	182,933	51.2
Hardwoods:		
White oaks[2]	14,880	4.2
Other white oaks	16,498	4.6
Red oaks[3]	7,469	2.1
Other red oaks	32,720	9.1
Soft maple	3,718	1.0
Beech	2,741	.8
Sweetgum	23,797	6.7
Tupelo and blackgum	22,807	6.4
Ash	4,730	1.3
Hickory	14,864	4.2
Cottonwood	1,462	.4
Yellow-poplar	9,579	2.7
Other hardwoods	18,870	5.3
Total	174,135	48.8
All species	357,068	100.0

[1]Board-feet log scale, International ¼-inch rule.
[2]*Quercus alba* and *Q. prinus.*
[3]*Quercus borealis, Q. falcata* var. *pagodaefolia* and *Q. shumardii.*

relatively low. Most of the land is producing timber at a rate far below its capacity. For instance, South Carolina leads the South in volume per average acre of saw-timber stands, but even there it is only 5,600 board feet. In eastern Oklahoma saw timber stands average less than 2,800 board feet, and in Mississippi and Tennessee, 3,500 board feet.

Of course, not all the land in the South is of equal productivity. But the disparity between average volumes of second-growth saw timber and old growth is too great to warrant full satisfaction with the present crop. In North Carolina, for example, the volume per acre in old-growth stands is two to three times greater than in uncut second-growth saw timber. This suggests that there is plenty of opportunity for building up the forest growing stock to possibly twice its current volume.

Total Volume in Cords

The total sound wood volume in trees 5 inches in d.b.h. and larger is 2.1 billion cords, of which 63 percent is hardwood and 37 percent softwood. Approximately 825 million cords of this material is in sawlogs. Sound wood in tops of saw timber trees amounts to about 208 million cords and pole timber trees contain about 568 million cords.

No less than 300 million cords of sound wood is in cull hardwoods. On most large industrial and public holdings, programs are under way to use or deaden the cull trees. On small holdings, little has been done. All in all, removal of this tremendous overburden of cull offers one of the best opportunities for rapidly improving the South's forest productivity.

Growth versus Timber Cut

The South, with about 40 percent of the nation's commercial forest land, produces about half of the nation's growth of both saw timber and growing stock. It can do this because of its lead in softwood growth — southern pines alone account for some 30 percent of the country's entire saw timber growth.

In 1952, net annual growth in the South was 6.8 billion cubic feet, of which 24 billion board feet were saw timber (Table 5). For the South as a whole, softwood saw timber growth increased 13 percent between 1944 and 1952; hardwood increased 12 percent.

The South's fast-growing timber stands now supply the bulk of the nation's pulpwood and more than a third of the lumber. Of the 5 billion cubic feet of timber cut in 1952, sawlogs made up 55 percent; pulpwood, 19 percent; fuelwood, 14 percent; and all other products 12 percent.

Cutting intensity varies locally, of course, and in some sections the timber cut exceeds growth. But regionwide, softwood saw timber is growing 24 percent faster than it is being cut; for hardwood, the margin is 21 percent. These favorable balances, however, have been achieved as much by reducing the cut as by increasing the annual growth.

The favorable hardwood balance must also be qualified by consideration of quality and species. Much of the hardwood saw timber is cut from good-quality logs whereas most of the growth is on small trees of low quality, some of which have little prospect of improving in grade. Moreover, this downgrading is intensified by species selection. Distinctly high-value species such as yellow-poplar are being cut more heavily than low-value species like hickory.

In short, optimism over the favorable growth balance must be tempered by realization that a great deal remains to be done before the South will achieve the full potential of her tremendous forest acreage.

TABLE 5.—NET ANNUAL GROWTH, ANNUAL MORTALITY, AND ANNUAL CUT OF SAW TIMBER AND GROWING STOCK ON COMMERCIAL FOREST LAND, 1952

Item	Saw timber		Growing stock	
	Soft-woods	Hard-woods	Soft-woods	Hard-woods
	Million board feet		*Million cubic feet*	
Net annual growth	14,495	9,522	3,564	3,243
Annual mortality	972	796	298	331
Timber cut	11,721	7,878	3,046	2,007

The Southern Hardwood Lumber Industry

George C. Romeiser
Southern Hardwood Producers, Inc.,
Memphis, Tennessee

WITHIN THE geographic area below the Mason-Dixon line, but including Missouri, two major hardwood lumber producing regions are recognized by the hardwood industry. The largest is the southern hardwood region which includes all or a part of 16 southern states. The area comprises all of Missouri[1], Arkansas, Oklahoma, Texas, Louisiana, Mississippi, Alabama, Florida, Delaware, and the lowland counties of Maryland, Virginia, North Carolina, South Carolina, Georgia, Tennessee, and Kentucky. The Appalachian region, on the contrary, includes West Virginia and the Appalachian range counties of Maryland, Virginia, North Carolina, South Carolina, Georgia, Tennessee, and Kentucky. Unless otherwise noted, this discussion will deal mainly with the southern hardwood region.

In the record hardwood production year of 1909 the southern states of Kentucky, Tennessee, and Arkansas reached their peak in volume, but it was not until the early twenties that the entire southern hardwood region took the lead in production. Since that time the relative position of the region in the pattern of total U. S. hardwood lumber production has changed very little. For more than 30 years between 55 and 60 percent of the U. S. total has come from the southern hardwood region. In 1909 the figure was roughly 35 percent.

During the period since the South's production of hardwood lumber began to lead the rest of the nation, the character of the industry has changed considerably. In the early twenties old-growth timber was still available in volume and at low cost. Vast tracts of superb bottomland hardwood stumpage kept most of the big band mills in the South operating without much trouble. It is estimated that during the twenties more than 75 percent of the region's hardwood production came from medium-to-big mills. Today, based on a recent analysis prepared by the Southern Hardwood Producers, Inc., it appears that no more than 35 percent of the total regional hardwood production comes from band mills or the few large circular mills. In terms of production class, this 35 percent is manufactured by sawmills having annual capacities of 3 million feet or more. Approximately 210 sawmills make up this group. About 65 of those mills produce solely hardwoods and cypress, while the rest mix pine and hardwood with a wide variation in relative production.

The remaining 65 percent of the total annual production comes from more than 25,000 small circular mills scattered throughout the region. Just how many of these mills produce hardwoods is impossible to determine, but in all probability more than one-half manufacture both yellow pine and hardwood lumber. In general, the greatest big mill activity is found in or near the bottomland hardwood forests of the Mississippi Delta and the other major streams in the South. The upland hardwood or the mixed pine and hardwood types support the bulk of the circular sawmills. The Tennessee Valley is an excellent example of the role small sawmills play in the total production picture. The Division of Forestry Relations, Ten-

FIG. 1.—Hardwood saw logs supplement cotton as an important income source for southern farmers.

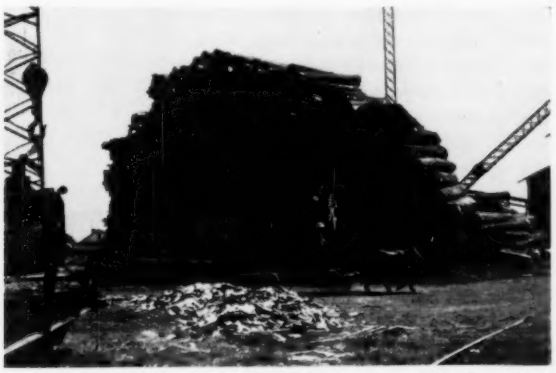


FIG. 2—Banked hardwood logs eliminate sawmill down-time because of winter and spring floods in bottomland hardwood forests. *—Photo Courtesy A.F.P.I.*

nessee Valley Authority, estimates that band mills produce no more than 10 percent of the yearly valley total, while part-time or full-time circular mills account for the remaining 90 percent. Approximately 4,000 mills are believed to operate part or full time in the Tennessee Valley. Louisiana, by contrast, leads all of the other southern states in big mill production. The 1953-1954 U. S. Forest Service survey of the state reported that four-fifths of the total softwood and hardwood lumber output came from mills cutting more than 3 million board feet per year.

The estimated production of southern hardwoods in 1955 amounted to around 4 billion board feet. The mill value of the product is believed to be roughly $350,000,000. Because of the part-time nature of many sawmills, as well as their size and transient nature, it is extremely difficult to develop an accurate picture of the total number of workers involved. Much of the woods work and sawmilling is done when farm chores are slack. However, as many as 200,000 workers probably receive full or part-time employment in connection with the South's hardwood lumber business.

On the basis of information contained in the preliminary draft of the Timber Resources Review and with minor adjustments in order to relate the figures directly to the region under discussion, it is estimated that the net volume of live hardwood saw timber totals about 150 billion board feet. This constitutes about 40 percent of the 380 billion board feet of live hardwood saw timber believed to be in the eastern United States. As to forest land area, the South has roughly 110 million acres of hardwood or hardwood-pine types while the remainder of the eastern U. S. has 140 million acres. Net annual growth in 12 southern states, in terms of hardwood growing stock, is estimated to be 162 percent of drain. Saw timber growth is said to be 121 percent of drain. Although these growth-drain comparisons are favorable, saw timber quality also enters into the picture as will be brought out later.

Within the southern hardwood region the oaks are the most important species group, making up roughly 40 percent of the total saw timber volume. Next in importance are the gums, namely sweetgum, blackgum, and tupelo, which constitute about 30 percent of the total live saw timber volume. The remaining 30 percent includes a wide variety of species such as yellow-poplar, cottonwood, hickory, pecan, willow, hackberry, magnolia, sycamore, elm, and ash.

The annual production of southern hardwood lumber is marketed in three general categories: lumber used in manufacture; ties, timbers, and planking; and local use lumber and dunnage. Exact figures applicable to the southern hardwood region have never been assembled to the knowledge of the author, but facts are available which will serve to point out the relative importance of each market group. Because all three categories bear heavily on the future of the southern hardwood industry, estimates of their respective requirements are of value.

Manufactured products are first in importance to the industry. Latest available estimates[2] suggest that about two-thirds of the annual southern hardwood production falls in this category. Top user of hardwoods in the field of manufactured products is the furniture industry. Roughly 25 percent of the yearly hardwood cut goes into furniture production. Sweetgum, blackgum, and tupelo together make up nearly 50 percent of the annual furniture industry requirements of southern hardwoods.

Running immediately behind the furniture manufacturers as a large scale consumer of rough hardwood lumber is the hardwood flooring industry. In fact, it is possible that since 1948 the flooring oak demand has exceeded that of the furniture plants in certain years such as 1955. The National Oak Flooring Manufacturers Association reports that 1955 was the peak production year with 1,220,000,000 board feet of oak flooring being produced. Roughly 1,600,000,000 board feet of oak lumber was required to produce this oak flooring volume. Around two-thirds of the rough oak lumber manufactured into flooring comes from the southern region. Additional but minor amounts of beech and pecan are also used for flooring to bring the total consumption of southern hardwoods for flooring to about 25 percent of the region's production.

Third in importance as a consumer of southern hardwods is the container market. In 1948 sweetgum was the top container hardwood, requiring 464 million board feet of lumber. This volume, along with several other regional species, brought the total 1948 figure to about 600 million board feet. Since 1948 there has been a decline in the use of certain kinds of containers but hardwood demand appears to have held up well in this field.

A newcomer to the list of big hardwood using products is the pallet. Appearing as a materials-handling tool in the late thirties, the wood pallet came into large-scale use during World War II. Since then the demand has boomed so that in 1955 it is estimated that over 300 million feet of southern hardwoods were fabricated into various kinds of pallets. The significance of the pallet to the hardwood industry is two-fold—it is a new market, and it provides a badly needed outlet for low-grade heavy hardwoods.

Because furniture, flooring, containers, and pallets utilize such a large volume of southern hardwoods, a look at estimated future requirements should be of interest. The Stanford Research Institute[3] suggests that furniture and fixture shipments in 1975 will be nearly double the 1952 figure. In

[2]Wood used in manufacture. Forest Resources Report No. 2, Forest Service, U. S. Dept. Agric. 1948.

[3]America's demand for wood. 1929-1975. Stanford Research Institute, Stanford, Calif. 1955.

the case of hardwood flooring, however, the report states that a continuation of a decline in the use of hardwood flooring per dwelling unit is anticipated. Oak flooring industry figures indicate, on the contrary, that there has been an increase in the per unit use of hardwood flooring since 1920. Another recent market survey reports that the hardwood flooring market is holding to expanding.

The decline in the use of lumber in containers is well known. The Stanford Report predicts wood will continue to fall off in market participation but increased total container demand will offset this decline. Regarding pallets, further expansion is anticipated in the use of wood, with the increase amounting to about 50 percent. Southern hardwoods should share proportionately in this rise.

From the standpoint of the major manufactured products, therefore, it appears that the demand for southern hardwoods is likely to increase moderately even though the per capita consumption may continue to decline.

The remainder of the estimated annual production of southern hardwoods is probably marketed rather evenly between ties, timbers, and planking, and local use lumber. The total sawed cross tie and switch tie production in the southern hardwood region can only be approximated but during the good tie market year of 1955 the total volume may have approached 400 million board feet. Most cross tie production comes from the small circular mills but a few of the band mills do cut switch ties. Although the demand and production of ties may vary considerably within the region, it is likely that long-term requirements will be relatively unchanged from the past five-year pediod.

Important to most large and small mills alike is the market for timbers and planking. This material is usually of a low-grade, although sound. It is used widely in rural communities for bridge construction and repair. A heavy demand also exists for thick hardwoods in the various oil fields where they are used for decking. Region-wide, this outlet probably approaches the volume consumed by cross ties and switch ties. Requirements are estimated to remain largely unchanged during the next 20 years.

Local use hardwood lumber, although frequently overlooked, is estimated to require around 600 million board feet in the southern hardwood region. Usually consisting of low-grade boards and dimension, the lumber is used for houses, barns, sheds, rough warehouses, garages, fences, and dunnaging. Being cheaper than most softwood yard lumber and readily available in the hardwood regions of the South, this local use lumber market will continue to be important to many sawmills.

Mention should also be made of the hardwood export trade in which 228 million board feet of lumber went to the United Kingdom alone in 1936. By contrast, 5 million board feet of American hardwood lumber entered the U. K. in 1953. Despite a tremendous effort on the part of certain segments of the industry during the past 18 months, the record for 1955 was only 15 million board feet. No doubt the future will bring further increase but not to the height which once prevailed.

The past 10 years have seen many improvements in the manufacture of hardwood lumber. In all likelihood the next 10 years will see even greater strides. The decline in the quality and size of hardwood sawlogs and a pyramiding of labor costs are the two big forces behind this change. Little immediate relief can be expected in regard to log quality, but many mills look forward to gradual improvement in the future. Others who buy stumpage in the open market will continue to be faced with the problem of operating profitably with lower quality logs.

Between the drop in log size and quality and the heavy increases in the hourly wage rate, southern hardwood mills have been under increasing pressure to develop top efficiency in the plant and among their employees. With the most recent increase in the minimum wage sawmill owners are scrutinizing every man and each job more carefully than ever before.

Early in 1956 the Southern Hardwood Producers, Inc., conducted a survey among their members to determine what actions were contemplated to minimize the effect of the increased statutory wage. The results indicated that mechanization within the sawmill was being given first priority in order to boost production and eliminate labor. Perhaps the biggest changes have taken place or will take place in the handling and stacking of lumber. Fork lift trucks, straddle trucks, and automatic stackers are the devices favored to cut costs. Complete changeover in yarding and stacking methods involves substantial capital expenditures, so many mills find it necessary to go slowly.

The factors which have created heavy pressure toward further mechanization and increased efficiency have also been at work to bring about more complete utilization of the hardwood log. Wood waste has always been a problem to the hardwood producer, and its use as fuel provided only a partial solution. It now appears, however, that answers to the disposal problem may be found in the chip board market and in pulping.

Already hardwood mills in the region are selling carload quantities of chipped kiln-dried and air-dried waste for conversion into other wood products. In addition, rapid strides are being made in developing new techniques for using hardwoods in many paper and hardboard products. The debarking of hardwood sawlogs in order that bark-free slabs and edgings may be chipped and marketed is no longer purely an experimental proposition. Taken together, these developments illustrate that hardwood utilization has just about reached the point where waste disposal will no longer cost the hardwood mill owner money but will

pay him a profit instead. At the same time, the lower grade hardwood trees will be able to help meet more of the demand for wood and wood-base products.

The economic potential of sound forest practices in the southern hardwood region has only recently begun to attract widespread attention. Substantially increased values for hardwood stumpage brought about by a strong demand for various products of the hardwood log have had much to do with awakened interest in hardwood forestry. No other single factor will do more to further the interest in good hardwood management than the prospect of "dollars in the pocket" for the forest property owner.

Because the South includes a large share of the most productive hardwood forest land in America, good forestry practices are more encouraging to the region's landowner. Individual lumber firms have done excellent work in certain localities through the tree farm family system. An increasing number of hardwood producers have undertaken this type of cooperative program which provides good forest management for the timberland owner and a more certain raw material source for the sponsoring lumber firm.

Aside from the small landowner whose forest lands are slowly getting more attention through industry and government programs, many millions of southern forest acres are in large industrial ownerships. Good forestry is well advanced here, especially in relation to southern pine. Hardwoods have not been entirely overlooked, however, and as cultural practices become better understood, it is likely that hardwood forestry will approach the high level of yellow pine.

Much credit is due the government employees who have cast their lot with the hardwoods. They have worked hard to sell the fact that the potential of the southern hardwood forests is high and in some cases greater than that of the softwoods. In view of the fact that the Timber Resources Review reports hardwood growing stock exceeding softwood growing stock by 23 percent in 12 southern states, hardwood forestry knowledge must be accelerated rapidly.

To summarize, 35 years ago big mills produced 75 percent of the region's hardwood lumber. Now small circular mills account for two-thirds of the production. Mill value of the product is estimated at $350,000,000 and more than 200,000 workers receive full or part time employment in connection with the industry.

Top species group from the volume standpoint is the oaks, with the gums in second position. Net growth of hardwood saw timber is around 121 percent of drain, but low grade hardwoods constitute an increasing problem.

Although per capita consumption of southern hardwoods may decline slightly in the future, overall demand is expected to increase. Many changes are taking place within the southern hardwood industry which are directed at cost reductions and improved utilization. The marketing of sawmill waste will become highly significant.

Better hardwood forestry is rapidly gaining momentum in the region. Because of the highly productive nature of the South's hardwood forests, future hardwood forest practices will be much more intensive.

Fire Research Correlation Conference

The Committee on Fire Research and the Fire Research Conference of the Division of Engineering and Industrial Research of the National Academy of Sciences - National Research Council is planning a special Fire Research Correlation Conference to be held at the National Academy of Sciences in Washington, D. C., on November 8 and 9. This conference will deal with the many scientific aspects of fire phenomena that are still incompletely understood but that must be understood in order to reduce peace-time fire losss and minimize war-time fire disasters.

The Federal Civil Defense Administration has sponsored the creation of the committee and the conference by the Academy of Sciences - National Research Council to represent all interested agencies. Attendance at the conference is by invitation. Any member of the Society of American Foresters actively interested in basic research on fire and the spread and growth of fire who has not yet received an invitation but would like to attend, should immediately write the executive secretary of the conference and request an advance registration card. His address is: Mr. D. W. Thornhill, Executive Secretary of the Committee on Fire Research and the Fire Research Conference, National Academy of Sciences, 2101 Constitution Avenue, Washington, D. C.

Southern Pine Lumber: Versatile Is the Word

Virgil W. Cothren
Forester, Southern Pine Association,
New Orleans, Louisiana

SOUTHERN PINE lumber has such a variety of desirable characteristics that versatile seems the most appropriate adjective to apply to this wood.

The needs of the various specifiers and users of building materials differ widely; they use materials for different reasons, but nearly all of them can use southern pine. The interior decorator is interested, first of all, in beauty, and the striking quality of grain and distinctive color is the appeal southern pine has for him. The architect, the engineer, the fabricators of glued laminated arches and beams place structural integrity and adaptability of materials at the head of their lists. Here again, southern pine fills the bill. The manufacturer of boxes, crates, and containers uses southern pine because it is tough, strong and has adequate nail-holding power to properly protect the contents.

These are only a few examples. As mirrored in its many uses, southern pine has not one but a thousand faces, each attractive in its own way to a specific category of admirer.

The theme of versatility carries farther than the idea that southern pine is an adaptable building material. There are other meanings, other interpretations. For the farmer, southern pine is fast becoming a major crop. For industry, southern pine lumber means a commercial colossus, constantly pumping fresh blood into the economic arteries of this vast region.

At last count, 317,000 workers were employed by the southern pine lumber industry. And when their dependents are added and all the other people involved in the production, distribution, and merchandising of lumber, the figure rises into millions. The annual value of products of the southern pine lumber industry is a staggering $2,253,000,000, and much of it is funneled back into various commercial enterprises of the thousands of communities it supports.

While there will be no attempt here to predict what the future holds, a good omen can be found in the health of southern pine saw timber supplies. Late last year, the 27,100 southern pine sawmills were informed by the preliminary Timber Resource Review released by the U. S. Forest Service that the growth of southern pine saw timber exceeded cut by 22 percent in 1952 or by an amazing 2½ billion board feet per year. The favorable balance is all the more extraordinary since it was accomplished in spite of the fact that southern pine furnished 24 percent of the nation's demand for lumber.

More than a trillion feet of southern pine lumber has been manufactured in the last 300 years. That is enough to build three times the number of homes in the entire United States. In 1955, the southern pine output was 8,696,000,000 board feet—8.6 percent higher than the 1954 production and 14.7 percent higher than in 1953.

Organized fire protection is spreading across the southern states and protection against insects and disease is improving. Increasing attention is paid to the principles of good forest management, and the southern pine lumber industry pioneered in these practices many years ago. The Southern Pine Association was a "trail blazer" in the southern tree farms movement in 1942, and the South now has more registered Tree Farms and more Tree Farm acreage than all the other sections of the nation combined.

These are developments that bode well for the future of southern pine lumber, and a real challenge is offered for research, development, product improvement, and new merchandising efforts aimed at broad horizons. The scope of the challenge has not caught the southern lumber industry unawares.

Already much has been done in the way of modernizing lumber mills, and increasing mechanization. More can be expected in the immediate future. This is aimed at both quality improvement and cost reduction, while there is no better example of the progressive outlook of the industry than the recent and rapid expansion of saw log debarking and chipping operations.

The first southern lumber mill to install debarking and chipping machinery did so in 1952. By the end of 1954, twenty-three mills had the equipment, and by the end of 1955, the total had passed sixty. Last year alone, the pulp chip capacity of the lumber mills in the South increased by more than 100 percent to an annual capacity of approximately 500,000 cords of chips per year.

Sawlog debarking and chipping enable the lumber manufacturers to get both lumber and pulp chips from the same log, and to use nearly all of the log in the process. More lumber mills are installing the equipment in 1956. Already, the practice has had the effect of releasing whole forests for further growth and future use. Conclusive proof thereby has been established that the well managed stand yields sufficient raw material both for lumber and paper manufacture.

Contrary to the predictions of some pessimists 50 years ago, the supply of southern pine is as-

sured for all time, and the lumber manufacturers are making every effort to follow through on this advantage.

The improvement in growth and quality of saw timber is reflected in changes of the southern pine grading rules, published by the Southern Pine Inspection Bureau. The 1956 revision of rules tightens up already stringent lumber standards, establishes the long sought all purpose, stress rated lumber grades. The latter should greatly improve the use of wood as an engineered material. It fulfills what the U. S. Housing and Home Finance Agency has described as "the greatest need to assure the efficient use of wood in residential framing."

The bulk of southern pine production goes into house framing, and other phases of home building. Recognizing this, and equally cognizant of the need for a better understanding by the public of lumber standards and the principles of sound construction, southern pine manufacturers have launched regional "quality" lumber programs in various states. Educational in nature, these campaigns give valuable information, such as that issued by the U. S. Forest Products Laboratory that "good houses never have been built with unseasoned lumber."

The "dry" lumber message has been carried far and wide and the grade mark has been set forth as an instrument of consumer protection. These programs have been strongly supported by the Southern Pine Association, and the evidence that their weight is being felt comes from all quarters. The U. S. Savings and Loan League, whose membership finances nearly 40 percent of all house construction, recently launched its own national crusade to improve the quality of new home construction after reporting that "more quality" is what prospective home owners want.

Naturally, these merchandising efforts are coordinated with production. The new grading rules of the southern pine industry are more restrictive regarding defects in structural lumber. Greater emphasis is placed on structural grades of good appearance, and this is at least partially responsible for the current trend of builders to expose the structure, the framing lumber, in new homes. Plank and beam construction is an excellent example, and in addition to building an attractive house, the system has served the purpose of engendering wide interest in the need for quality in framing lumber.

Currently, southern pine is providing nearly one fourth of all lumber produced in the United States. No one knows what that ratio will be in the future, but the southern pine manufacturers are gearing for increased markets.

Certainly there will be great demands on them from the prefabricators of houses. The fast growing prefabrication industry already is furnishing more than 100,000 homes annually. In the process, engineering principles are applied to home building, and the new all purpose stress grades of southern pine are ideal for this purpose.

Farmers are becoming increasingly important customers. The suitability of southern pine to the pole frame type of construction and its ease of treatment are big factors here, while the grade marking apparatus gives considerable aid and comfort to the hundreds of thousands of farmers who buy lumber to build their own farm buildings.

Although the process of wood lamination is not new, the vast improvement in the technique is recent, and so this must rank as one of the great markets of the future.

The strength of southern pine and its beauty in an exposed condition appeals to the manufacturers of glued laminated wood, and in only three years, its consumption for this purpose has increased by nearly 500 percent. Recently, laminated arches of nearly 250 foot clear span were made with southern pine, and the fabricators report that they are just beginning to exploit the possibilities in this vital area. Several hundred churches and schools were built with glued laminated southern pine arches and beams last year, and this year there has been a marked increase in their usage in the residential market. (See cover.)

Several wood laminating plants have been located in the South so as to be near the sources of supply.

The designers of today are making more efficient use of the inherent strength of wood. This is apparent from the fabrication of truss roof rafters and other members in which the loads are conveyed from one part to another with each part used to the full capacity of its strength. Of course, this gives added opportunity for exploitation of the superior strength of southern pine, while the development of new stress grading formulas by the U. S. Forest Products Laboratory tells the designer to a point of certainty the load an individual stress graded southern pine member will bear.

In closing, a word about the distribution of the South's commercial forest lands. Total commercial forest land in private ownership is 176,609,000 acres. Of these, 90,143,000 are in the hands of farmers, while only 33,523,000 are owned by the forest industries. This points out the farmers' opportunity to supply more saw timber in the fulfillment of current and future needs of the southern pine lumber industry.

The Southern Pine Association has been giving advice on how farmers can develop their forest holdings so that they will furnish good quality sawlogs for lumber manufacturers. The progress made by farmers in good forest management is evident from the fact that more than 60 percent of all southern tree farmers are farmers in the strict sense of the term.

As far back as 1609, Captain John Smith in a report to the Virginia Company made note of the fact that the "Countrey is overgrowne with pyne."

What a posteript he could have penned today!

The Pulp and Paper Industry in the South

H. J. Malsberger
Forester, Southern Pulpwood Conservation Association, Atlanta, Georgia

THE MANUFACTURE of pulp and paper in the United States is one of our oldest industries. History tells us that the first recorded attempt at paper making in the United States dates back to 1690 when a mill was constructed near Germantown, Pennsylvania. Contrary to a majority of prevailing thought, the industry is not even new in the South.

A paper mill was established at Williamsburg, Virginia, in 1744, and a second mill was erected two years later at Salem, North Carolina. The earliest papers were made from rags beaten to a pulp by a heavy hammer, usually wielded by hand. Straw also was used as a raw material in these early paper-making attempts.

Probably the first successful attempt to manufacture paper from southern pine wood pulp took place in 1878 at the Marietta Paper Manufacturing Co. near Atlanta, Georgia. The pulp was made from shortleaf and loblolly pine groundwood and mixed with rags. The first continuous production of pulp from southern pine on a commercial basis was accomplished in 1891 by the Carolina Fibre Co. of Hartsville, South Carolina, using the sulphite process.

The sulphate, or kraft, process which is predominantly used in the South today had its inception on a commercial basis in 1909 at Roanoke Rapids, North Carolina. From this date on, numerous sulphate, soda, and recently sulphite and newsprint mills have been erected in the South. This culminated in the rapid expansion of the pulp and paper industry in the 1930's and again in the 1950's.

The earliest complete record of pulpwood consumption in the South (that the author has) is for 1930 when 1½ million cords were used. After the expansion ending about 1937, 30 pulp mills consumed approximately 3 million cords a year. In 1948, there were 50 pulp mills consuming in excess of 8 million cords. In 1954, there were 67 pulp mills using an all time high of 16.3 million cords. And at the present time, there are at least 11 additional pulp mills under construction, with definite plans for construction, or in the planning stage. In addition, expansions of existing facilities in the industry are under way in practically every southern state.

It is logical to predict, in view of this definite expansion, that southern pulpwood use will be in the neighborhood of 25 million cords by the end of 1958.

The pulp and paper industry has made a continuous and rapid growth during the past 20 years, and the end is probably not in sight. People continue to demand the products of wood pulp for numerous items essential to the maintenance of our present living standard. This is evidenced by the fact that the per capita consumption of paper in the United States is 415 pounds per year—the highest in the world.

The pulp and paper business in the South has made a definite impact on the economy of the region and now ranks as about the third largest wealth producer. The paper industry has made a tremendous capital investment in the South in an amount exceeding 2 billion dollars. In 1954, it provided direct employment to 80,000 plant workers with an annual payroll of approximately 275 million dollars. An estimated 61,500 woods laborers had gainful employment. Their income plus costs incident to delivery of pulpwood to the woodyard at the mills accounted for the disbursement of an additional 300 million dollars. Paper sales totaled over 2 billion dollars as compared to the value of 2.9 billion dollars for the cotton crop. The South now makes more than half of the country's production of woodpulp and produces 60 percent of the pulpwood supply.

The 67 pulp mills currently operating in the South, classified by types of manufacturing processes, are as follows: sulphite—3; sulphate—39; groundwood—12; soda—4; semi-chemical—5; and miscellaneous—4. The manufacturing process practically indicates the kind of product produced. The sulphite mills manufacture a pulp from which fibre for rayon is produced. The sulphate, or kraft, mills manufacture products requiring strength qualities for such uses as containers, wrapping papers, and bags of all descriptions. A refinement within the sulphate process permits the production of rayon from hardwood. Another departure in this process is the production of a bleached pulp used for tissues which combines the use of hardwood and pine pulp.

The groundwood process produces materials used by the board industry for building materials and other home use and newsprint. The soda and semi-chemical processes primarily use hardwood and make chiefly writing and book papers, and packaging items requiring less strength than those made with the kraft process. Items for interior building use generally characterize the products of the group falling in the miscellaneous classification. A distinctive process of exploding the wood fibre is included in this group. Where mills

use more than one process, this classification was made on the basis of the process consuming the larger amount of wood.

The long fiber of the southern pine makes it a preferred species for those paper and board products requiring strength. That accounts for the predominance of sulphate or kraft mills in the South, amounting to 58 percent of the total. It also largely explains the reason that of the total pulpwood used in the South, 87 percent was pine and 13 percent hardwood during 1954. In 1952, the South produced 82 percent of the national production of wood pulp by the sulphate process. Current percentage is probably at a higher level.

Three groundwood mills produce newsprint, and a fourth will be in operation before the close of 1956. Another has been announced which will probably be operating by 1958.

The use of both hard and soft hardwoods for pulping has been steadily, although gradually, increasing since 1949. It amounted to 808,700 cords in 1949, representing 8 percent of total usage, and 2,128,800 cords in 1954, or 13 percent of total. Although this represents a significant increase of 163 percent during this period, it remains a small percentage of the total. During the same interval, pine pulpwood use increased 58 percent, but that represented about 5.2 million cords. Technological advances, however, assure a rapid increase in the use of hardwoods for the future. This is particularly true with regard to the progress made in the use of the semi-chemical process.

The phenomenal growth of the pulp and paper industry in the South since the 1930's has made a major contribution to the vast strides made in industrializing the South. The impact on the regional economy is quite equally distributed, due to the location of the pulp mills. The industry is essentially a rural enterprise locating its mills in small towns where they are quite often the major or only source of payrolls and tax-producing base. Pulpwood, the raw material, is purchased from adjoining landowners, but the majority of wood is shipped by rail or water, thus adding to the economy of many small communities far removed from the mill site.

The location of the pulp and paper mills in the southern states covered in this article will emphasize their distribution throughout the region. There are 7 in Alabama; 2 in Arkansas; 10 in Florida, 10 in Georgia; 8 in Louisiana; 6 in Mississippi; 5 in North Carolina; 3 in South Carolina; 5 in Tennessee; 3 in Texas; and 8 in Virginia. Seven of the announced new mills have definitely indicated their location: one in South Carolina, four in Alabama, and two in Arkansas. The remaining four at this writing have not made an official announcement as to location.

These locations of existing and proposed mills, with few exceptions, are with reference to the pine growing area. Originally, factors such as transportation facilities, both rail and water, labor supply, and proximity to markets were paramount in determining mill location. These usually coincided with the raw material supply, but now each new location is selected only after very careful consideration has been given to the supply of wood.

A comparison of past growth and a look at the predicted expansion will highlight the economic importance of this industry. In 1930 about 1.5 million cords of wood were used. This use exceeded 18 million cords in 1955. The Stanford Report predicts a use of 30 million cords by 1975 and, based upon the present degree of expansion, this estimate will likely be on the low side. The Timber Resource Review predicts a national use of 90 million cords by the year 2000. If the South only maintains its present percentage of total output, it will mean producing close to 55 million cords of pulpwood in the South at that time.

On the basis of the Stanford prediction for 1975, the South will be cutting 22 million cords of pine and 8 million cords of hardwood. Pine from growing trees will account for 19.5 million cords, and 2.5 million cords will be reclaimed from former waste materials in the form of chips from mill residues. Hardwood from logs and bolts will produce 7 million cords with another million from waste.

The greatest increase in hardwood utilization for the nation is predicted for the South where consumption is expected to increase from 1.8 million cords in 1952 to 8 million cords in 1975, representing an increase of 345 percent.

Conversion of waste materials from other wood industries to chips for pulp is in its infancy in the South. The present use is equivalent to about 125,000 cords annually of both pine and hardwood. As greater experience is gained in collecting wood from slab concentration areas and as new debarking and chipping techniques are developed, a continuing expansion in use of this material is anticipated, amounting to 3.5 million cords of both species by 1975.

A very logical question to raise, after reviewing this consumption of pulpwood, plus other forest products not enumerated in this article, is where is the wood coming from. The 193 million acres of commercial forest land in the South is the source of supply.

In 1952, 5.05 billion cubic feet of wood were cut in the South for all purposes. Pulpwood used 962.5 million cubic feet, or 19 percent of the total. The predicted cut for 1975 for all products and uses is 5.30 billion cubic feet, of which 1.92 billion cubic feet, or 36.2 percent will be pulpwood.

The TRR reveals that in the southern region for all species growth exceeds cut by 35 percent. Pine growth, however, exceeds cut by only 17 percent. Hardwood growth exceeds cut by 62 percent.

This is a very encouraging picture, showing for the first time in recent surveys a favorable balance of growth over use. It must be referred to, however, with reservations, and a more realistic picture is obtained when the data is

reduced to its component parts.

The forest type classification of the 193 million acres in the South is 81.5 million acres in pine; 20.5 million acres in mixed pine-hardwood and 91 million acres in hardwood. Insofar as the pulp and paper industry is concerned, it cuts 87 percent of its supply from the pine and pine-hardwood acreage which represents 53 percent of the total forest land. The remaining 13 percent is cut from 47 percent of the acreage. As more hardwood is utilized, this ratio will be improved. At the present time, however, surplus growth of hardwood, which contributes so largely to the favorable balance of growth over use, cannot be used as a replacement for pine in the industry, nor is that forseeable at any time in the future.

The forest landownership pattern must also be examined before arriving at hasty conclusions. The South is a region where private ownership predominates, and that must be clearly understood. The farmer owns 90 million acres and all other small private ownership combines to make a total of 143 million acres, representing 74 percent of the total. Wood-using industries own 33.5 million acres or 17.5 percent. This comprises ownership of 18 million by the lumber industry, 12 million by pulp and paper, and 3.5 million in all other industrial ownership. Government agencies, including federal, state, and local, own 16.7 million acres or 8.5 percent. Pulp and paper ownership represents 6.3 percent of the regional total.

The level of productivity of forest growing stock must also be correlated with the ownership pattern since the TRR provides revealing information on this relationship. The 26 percent owned by government and industry is rated from 73 to 81 percent productive nationally and as high as 96 percent for the lands owned by the southern pulp and paper industry. Good forestry is being practiced on large blocks of forest lands regardless of ownership, including the large private owner. This is not the case on small tracts in private ownership where the comparable figure for level of productivity is at a low of 40 percent. This level prevails as an average on 143 million acres of southern forest land, a tremendous acreage where even minimum practices can result in greatly increased output of forest products.

This ownership pattern and the source of today's pulpwood gives us an insight into where it must come from in the future. The pulp and paper industry purchases about 75 percent of its requirements on the open market and the remaining supply is obtained from company lands.

The land acquisitions of the industry have largely been transfers of large blocks from other industrial owners. These original land purchases were ordinarily burned over and badly depleted in growing stock. As these lands increase in productivity, the pulpwood cut will increase and perhaps a future goal is to be able to cut as much as 50 percent from company holdings. This begins to look improbable at the present level of industry ownership of forest land due to the rapid expansion ahead of predictions. Large private ownerships and government lands will produce more pulpwood as intensive management practices increase growing stock, but percentage wise no considerable increase in volume is anticipated.

The pulp and paper industry has a tremendous stake in southern forestry in (1) providing for the best possible forest management on its own lands and (2) doing everything possible to sell this same idea to the small landowner. Not only does the industry have an important stake in southern forestry, but it also has an abiding faith in people and the ability of both to grow the wood required to meet future demands.

This faith is manifested in many ways. The industry is losing no time in making its tree factory as fully productive as the pulp and paper plant. It is backing this faith in the tree crop and protecting its investments in both forest lands and plants by employing the necessary personnel and making the expenditures necessary to do the forestry job.

It has given leadership through both talent and finances to pressing forestry problems requiring research in the fields of forest genetics, forest soils, insect and pest control, systems of forest management, and forest fire research. Many forestry scholarships are being made available at the undergraduate and graduate level to provide more technical men.

Industry has made great strides in supplementing the forest fire suppression facilities of state organizations with both man power and equipment. This action, of course, is to provide more intensive protection in order to assure maximum production of wood crops. Large numbers of areas low in production because of the encroachment of undesirable hardwoods are being regularly treated to restore pine. The large tree-planting program on company lands is also indicative of industry's intention to make each acre fully productive.

The establishment of seed orchards and financial support to several genetic studies in the South by industry is further evidence of its desire to raise trees of superior quality and development of insect and disease resistant species.

The moral and financial support given by the industry to the recent Southern Forest Fire Prevention Conference acknowledges its realization of the necessity of driving wild fire from the forests in all the southern states.

As far back as 1937 the industry recognized a need to be helpful in keeping all privately owned forest lands fully productive. This culminated in the formation of the Southern Pulpwood Conservation Association in 1939 with a stated program of helping to grow wood on the other fellow's land. This is a program that is entirely supported by the pulp and paper industry and with the same objective as the public forestry agencies. Through the wise use of the forest resource, productivity can be

maintained and increased to the financial advantage of the small owner and to the economic advancement of the region.

Many projects are engaged in by the association and its members to achieve this objective, but only those providing direct service to the owner will be mentioned. Conservation foresters employed by member companies provide management suggestions, conduct woods demonstrations, and mark trees to be removed, reserving the best for future growth. At least 150 full time industry personnel are available to provide this service which annually reaches thousands of small landowners.

The association does not confine its activities solely to reaching the adult. For 10 years members of S.P.C.A., in cooperation with state agencies, have been providing forestry training to farm youths through the annual one-week forestry training camp. Close to 1,000 boys a year during this period have received training which will help them do a better job of growing wood on their farm woodlands.

Many pulp and paper companies throughout the South further engage in intensive forestry programs to reach the youth. These include distribution of comic style pamphlets to school children with varying forestry messages, establishment of school forests with technical guidance provided by industry foresters, forestry essay contests in high schools, and the channeling of a portion of the tree seedling activity through youth groups.

In recognition of the accepted need to more specifically inform the small woodland owner of his opportunity to grow more wood, S. P. C. A. and its members are currently engaging in an activity which shows a great promise of better accomplishing this objective.

The industry is host to representatives of the Extension Service, Soil Conservation Service and teachers of vocational agriculture in the various states. These groups are small in order to allow for ample discussion of such matters as the landownership policy of the industry, its system of wood procurement, and service program to small landowners. These representatives of agricultural agencies have a close contact with the landowner, and through establishment of a base of understanding of industry's forestry programs with them, many more landowners can be reached in a shorter time. It has been clearly demonstrated through meetings of this kind already held that a mutuality of interest exists between agencies and industry, relative to the small landowner and his tree crop, and that this cooperative approach will result in real tangible progress.

Practically all companies engage in a program of free or partially matched system of tree distribution. The small landowner is encouraged through this program to plant his idle or abandoned farm land or understocked forest lands in a productive crop of trees. The first complete record of this activity is for the year 1947. From that year through the planting season of 1954, industry planted 578 million trees on its own lands and contributed 191 million to small owners, totaling 769 million trees in eight years.

The small landowner is the key to the future of the pulp and paper industry in the South. The industry does not own enough land to support itself, and for the future it appears as though industry must expect the small landowner to supply 50 percent of its total requirements. This small landowner looms very large and important whenever southern forestry is deliberated. Increasingly, he must be educated to the fact that this business of growing tree crops is a splendid opportunity. There are some usual business risks involved, but certainly no insurmountable problems.

The recent reports covering the wood situation in the nation and the present accelerated expansion of the pulp and paper industry in the South are cause for reflection. This information, properly interpreted, provides the basis for an accurate appraisal of the situation. From this it is apparent that the amount of pine-growing land, landownership pattern, and relation of growth to cut for pine and hardwood separately, are among the major factors affecting the future growth and stability of the pulp and paper industry. As these factors and their implications are fully recognized, then more intensive courses of remedial action will be forthcoming. There is no pessimism concerning the future wood supply in the South implied in this conclusion. There is only the admonition that after the facts are known they be acknowledged and acted upon according to their importance.

The progress achieved through the S.P.C.A. program in the past, although not as rapid as the situation demands, supplies conclusive evidence that the industrial approach to the small landowner is satisfactory. The job ahead for the industry, as well as all other interested agencies, is to accelerate and enlarge those activities. Then the hope for all concerned is that the small landowner will rapidly and in increasing numbers accept and adopt improved forest practices.

Naval Stores

Harley Langdale, Jr.
President, The Langdale Co.,
Valdosta, Georgia

THE PRODUCTION of gum naval stores in the United States dates from early colonial days when the British government required tar and pitch for the British Navy. The need was so urgent that subsidies were offered to encourage the colonists in gum production. Later laws prohibited shipments to other ports than those of England and undertook to regulate the quality and quantity of production of all tar, pitch, and turpentine, even requiring the producer's brand on all barrels.

Tar burning, first a New England monopoly, moved southward to North Carolina in about 1665 where the new settlers found the southern yellow pine a more productive source of gum than the pitch pine of the North. Subsequently gum naval stores have been produced from Virginia southward along the coast to Florida and westward along the Gulf of Mexico to Texas. Present commercial production is confined to South Carolina, Georgia, Florida, Alabama, and Mississippi and to two pine species—longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii*).

The U. S. Forest Service[1] estimates a total of 43,500,000 trees worked for gum naval stores in 1954, producing 152,000 barrels of turpentine (50 gallons each) and 450,000 drums of rosin (517 pounds net each).[2] Approximately 87,000 people directly dependent upon the industry for their livelihood received some $14,000,000 in annual wages. The 1954 total value of the gum naval stores crop is estimated at $33,000,000. Production

FIG. 1.—Chipper working turpentine face. Modern methods permit full utilization of the tree for saw logs or pulpwood following cropping for gum naval stores.
U. S. Forest Service photo.

was distributed among the states as follows:

Georgia—78 percent
Florida—16 percent
Alabama—5 percent
Mississippi—0.5 percent
South Carolina—0.5 percent

Early naval stores producers worked the trees of the virgin forest just prior to their harvest for saw timber. Until the early part of this century their technique was known as "boxing." It consisted of cutting a "box" or cavity into the base of the tree for collection of the crude gum as it flowed down the trunk following scarification or "chipping" of a "face."

Following 1901-02 experiments of Dr. Charles H. Herty a new system, using a cup and gutter for collection of the crude gum, was adopted which was better suited to the smaller second-growth trees than boxing and is still in use. Subsequent developments from research have brought further improvements in techniques. Sulphuric acid treatment of the face permits cutting it only to the depth of the outer surface of the wood using a specially developed bark hack. The formed gutter, which fastens to the tree by easily removed duplex headed nails, results in virtually no damage to the tree for future uses after being worked for naval stores. All tins can be removed, thereby not reducing the tree's value for saw timber. Tree boles are left round and can be used for poles, posts, crossties, sawlogs, pulpwood, and other products. These developments make it possible to better coordinate naval stores production with other forest management needs.

The gum naval stores farmers were among the first in the Southeast to handle forest lands under a plan of sustained yield management. Naval stores are a crop,

[1]U. S. Forest Service. Naval stores conservation program statistics. Valdosta, Ga., March 10, 1955.

[2]U. S. Dept. Agric., Agricultural Marketing Service. 1955-1956 Annual naval stores report.

Trees are worked from a minimum of three to a maximum of twenty years. From 1900 to the mid-forties the industry was one of enormous economic importance in the slash and longleaf pine regions and it was obviously necessary for the producer or owner to safeguard trees during operations in the light of future needs for continuous supply of trees.

Naval stores farmers were practicing fire protection measures before any public protection organizations were formed in the South. Individual firebreaks were made around trees being worked. In Georgia and Florida, and possibly other areas, timber protective organizations of adjacent landowners were formed.

Naval stores farmers led in reforestation also. They were the first landowners on the Southeast to plant pine seedlings on a large scale basis. Many of those plantations are now being worked for gum.

Forest inventories of the South attest to the large volume of timber products annually removed in the slash and longleaf pine areas and the large volume now present. No small factor in this favorable situation has been the fact that a gum naval stores producer when making sales of saw timber generally limits the cut to trees worked out for naval stores.

The naval stores belt supports the largest number of year-round forest workers per unit area of any region in the United States. The majority of the land is owned by small owners and during the last 15 to 20 years the belt has also become an area of heavy concentration for the pulp and paper industry which, together with the lumber industry, is doing an outstanding job of forest management and protection. The opportunity for intensive management and integrated production is apparent.

The peak year of gum naval stores production was 1908, with 750,000 barrels of turpentine and 2,150,500 drums of rosin.[3] Since that time the total production of naval stores has not fluctuated greatly but that produced from gum has declined. During 1910 and 1911 wood turpentine and wood rosin began to be extracted from virgin longleaf pine stumps by a steam distillation process. Some 10 years later wood naval stores had become a serious competitor with gum naval stores. Now a comparatively new type of naval stores is being made as a by-product of the southern pulp and paper industry. Sulphate rosin and turpentine are being produced from tall oil, a primary by-product of the sulphate paper-making process.

Today the wood industry accounts for approximately 65 percent, gum 20 percent, and sulphate 15 percent of the United States supply of naval stores. The source of raw material for the wood naval stores industry (virgin longleaf pine stumps) is on the decline. That of the sulphate naval stores industry is dependent upon the amount of pine pulpwood used in the production of pulp and paper of which it is a by-product. To the forester and the landowner, therefore, gum naval stores are the object of primary interest and concern as relates to the purpose of this article.

What of the future of the gum naval stores industry?

An important consideration is the fact that the supply of stumps for the wood naval stores industry will continue to diminish each year. It is logical to assume that longer hauls of raw material will increase transportation costs; older and inferior stumps will yield less; and the cost of manufacture will continue to increase. Such an increase will place the gum producer in a more favorable position for profitable competition.

There is much speculation as to the future of sulphate turpentine and rosin. The quantity of tall oil is increasing as the sulphate pulp and paper industry continues to expand and a good number of tall oil refining plants are presently under construction. The paper industry, however, is the largest consumer of rosin, which is used to size paper. Reliable sources predict that the paper industry itself will use approximately half of the rosin resulting from future increases in production of sulphate naval stores.

Increased use of rosin by the paper industry, taking a good portion of possible increased production, and the anticipated decline in wood rosin production indicate a favorable situation for the future of gum naval stores.

Only 10 percent of the slash and longleaf pine of gum production size are currently being worked. More trees are being grown each year. What portion of the landowners will make their timber available for future naval stores cropping? The Southeastern Forest Experiment Station research center at Lake City, Florida, basing estimates on production costs and studies[4], states: that 40 percent more income can be derived from a tree (slash or longleaf) 10 inches d.b.h. if it is worked for naval stores before harvesting for saw timber; that 83 percent more income can be derived from the tree if it is worked for naval stores prior to harvest for pulpwood. It is safe to assume that timberland owners will not overlook this source of added revenue should economic conditions make necessary maximum income from forest lands in the slash and longleaf pine belt. There is strong encouragement for increased production in the years ahead.

Greater use, too, can be expected to be made of naval stores products in the future, therefore increasing demand.

Gum turpentine,[5] one of the two principal products, is a volatile oil that consists primarily of a number of terpene hydrocarbons—a-pinene, b-pinene, camphene, carene, dipentene, and terpinolene. The principal use of turpentine is as a solvent in paints and waxes, friction paste, shoe polishes, store polishes, furniture and floor polishing liquids, floor wax, auto pol-

[3] U. S. Dept. Agric., Agricultural Marketing Service. Annual naval stores report.

[4] 1954 Annual Report, Southeastern Forest Experiment Station and unpublished paper by Kenneth Pomeroy, 1955.

[5] Goldblatt, Leo A. Chemicals we get from turpentine. U. S. Department of Agriculture Yearbook, 1950-1951.

ish, modeling and grafting waxes, and drawing crayons. It is an ingredient of wood fillers and wood stains; it is used in ceramic work for application of colors and as a lubricant in grinding and drilling glass. A small amount is used for medicinal purposes and in prepared drugs, liniments, and pharmaceuties. Many insecticides contain turpentine for its solvent and insect-killing properties. Home owners use a great deal of turpentine; in fact, in 1955, ninety-five percent of the domestic sales of gum turpentine was in bottled form sold through hardware stores, drug stores, and other retail outlets. Intensified research can be expected to broaden markets for such a valuable chemical raw material.

Gum rosin [6] is about 90 percent resin acids and 10 percent neutral matter. The resin acids are 9/10 isomeric with l-abietic acid and 1/10 dihyeroabietic and dehydroabietic acids. The principal uses of rosin are in the manufacture of paper size, varnishes, lacquers, and other protective coatings, and soap. Small amounts are used in a large number of other industries—toi instance, the rubber, lineoleum, grease, adhesive, and foundry industries. With increasing recognition of the potential uses of the products manufactured from rosin an increased demand for specialized chemical products can again be expected.

Research efforts in both utilization and production bearing upon the gum naval stores industry continue. The Naval Stores Research Section of the Agricultural Research Service, U. S. Department of Agriculture, located at Olustee, Florida, has developed improved processing methods which have done much to stabilize the quality of gum turpentine and gum rosin and helped to renew the confidence of manufacturers in these two commodities. At the present time under the capable leadership of E. L. Patton, the research section at Olustee has placed increased emphasis on studies of the fundamental properties of pine gum and rosin. There is a vigorous program of applied utilization research that should lead to the development of entirely new products to supplement the traditional turpentine and rosin markets.

Similarly, through the efforts of the U. S. Forest Service at the Lake City, Florida, branch of the Southeastern Forest Experiment Station, an outstanding job has been done in developing modern methods in the production of gum naval stores. Research that has developed the bark hack, the use of sulphuric acid, the form gutter, and other operational techniques results in virtually no damage to the tree for subsequent uses after being worked for naval stores.

Research in forest tree improvement is going forward with phenomenal strides. We expect, within a comparatively few years, to have a tree capable of producing almost twice as much gum as the average tree produces today. Lower costs in production will increase profits.

The production of gum naval stores often brings in as much return to the owner as does the tree in other products. By wise, integrated use of forests in the slash and longleaf pine belt it is therefore possible to derive an additional and continuous income by cropping the trees for gum naval stores before harvest for other products.

[6] Lawrence, Ray V. The industrial utilization of rosin. U. S. Department of Agriculture Yearbook, 1950-1951.

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R. Boyd Leonard
(1913-1956)

R. Boyd Leonard, assistant supervisor of the Dixie National Forest, Cedar City, Utah, died April 14.

Born in Farmington, Wash. July 17, 1913, he obtained a B.S. degree in forestry at the University of Idaho in 1939, and a Master's degree in agronomy at Brigham Young University in 1947.

He joined the U. S. Forest Service in 1939, and served in various national forests in the Intermountain Region. He specialized in both range management and timber management.

Specialty Products from Hardwood and Pine in the South

Walton R. Smith
Chief, Forest Utilization Service,
Southeastern Forest Experiment Station,
U. S. Department of Agriculture,
Forest Service,
Asheville, North Carolina

FORESTERS in the South think primarily in terms of sawlogs and pulpwood, since these comprise the bulk of the timber removed from southern forests. Few realize that over 26 percent of the timber cut from the growing stock is used for other products, according to the recent Timber Resource Review (Table 1). Sawlogs and pulpwood take most of the pines (about 87 percent), but 45 percent of the hardwoods go into varied products, indicating, of course, the much greater versatility of hardwoods.

TABLE 1.—TIMBER CUT FROM GROWING STOCK ON COMMERCIAL FOREST LAND IN THE SOUTHERN REGION OF THE UNITED STATES, 1952[1]

Products	Softwoods	Hardwoods	All species
	M cu. ft.	*M cu. ft.*	*M cu. ft.*
Veneer logs and bolts	9,344	192,279	201,623
Cooperage logs and bolts	22,651	53,290	75,941
Fuelwood	209,654	483,411	693,065
Piling	21,032	287	21,319
Poles	72,785	590	73,375
Posts	22,947	41,397	64,344
Hewn ties	31,761	75,102	106,863
Mine timbers	4,415	9,202	13,617
Others	22,309	61,854	84,163
Total	416,898	917,412	1,334,310
Percent of total cut	13.8	45.7	26.4

[1]From Timber Resource Review. Includes states of Alabama, Arkansas, Florida, Georgia, Louisiana, North Carolina, Mississippi, South Carolina, Tennessee, Virginia, east Texas, and east Oklahoma.

These specialty products are veneer logs and bolts, cooperage, fuelwood, piling, posts, poles, ties, mine timbers, baseball bats, shuttleblocks, golf clubs, bows and arrows, and a hundred other items. They are important to the nation as well as to the small timber owner. They have two very important implications on southern forestry. One, they provide an outlet for vast quantities of material that is not suitable for sawlogs or pulpwood. In many areas, pine in very thick, young stands can be thinned early to prevent stagnation, and the products can furnish 3-inch fence posts—material too small for pulpwood. Likewise, the rough large hardwood culls can be removed and put into charcoal, rough timbers, or fuel wood. The fact that these numerous products offer an opportunity to utilize almost 1½ billion cubic feet of such material each year in the South certainly makes it important that the forester be fully acquainted with the opportunities for marketing them. Second, large quantities of labor are employed in the manufacture of these southern specialties. A good example is the dogwood shuttle industry, wherein a cord of dogwood bolts brings a delivered price of about $50 (about 25c per rough shuttle block), and then the shuttle block goes through some 170 separate machine operations before it is converted into a shuttle suitable for use in a textile mill, with a unit value of from $5 to $8. In most cases the labor on these products is southern labor, and the benefit of production stays at home. This is in contrast to the common practice of shipping rough or dressed lumber to other parts of the nation for remanufacture into other products.

Veneer and plywood is perhaps the most important of the special products industries. At present, this industry uses over 200 million cubic feet of timber each year, practically all of it hardwood. Although much of the production from veneer mills in the Southeast goes to furniture plants, an increasing quantity is going directly to consumers as plywood for interior paneling, doors, and numerous other products. The veneer and plywood industry has faced up to the problem of utilizing little-used hardwood species, and many plants are now finding new horizons with species such as southern oaks, hickory, southern gums, and maples. Slicing techniques have brought out grain patterns and characteristics that were not possible on rotary lathes. Forward-looking mills have developed paper-faced veneer—a low cost container item; they have also developed high-grade plywood paneling from low-grade oak (Fig. 1).

Southern forests have always more than supplied their share of the poles, piling, fence posts, mine timbers, cross ties, and other round and semi-round products so important in transportation and farming. Although numerous attempts have been made to develop substitutes for these products, the substitutes have failed almost without exception, and wood still reigns supreme for these uses. Moreover, new technological advances in laminating, fireproofing, and preserving have put wood in a far more favorable position than it was formerly.

One of the disadvantages often quoted for wood is its long seasoning period—18 months, for instance, to dry telephone poles and cross ties to a moisture content suitable for preservative treatment. The recently developed vapor-drying method has changed months to hours and has provided one solution to the seasoning of large poles and timbers. Other

rapid-seasoning methods now include the use of incising, and a patented process used by one company known as "controlled air seasoning." All these new methods give a product that is seasoned more rapidly with less degrade than by the former air seasoning methods.

Likewise, new preservative treatments have been developed which permit not only the rapid treatment of timbers with preservatives and oil solutions of several different kinds, but permit the recovery of the solvents used in applying the preservatives, thus resulting in a clean preservative treatment that has all the appearances of normal wood, but which can be expected to last more than a generation without attack by termites or decay fungi. In actuality this means that the wood-treating industry can provide clean-treated wood for home construction.

Another innovation on the southern landscape is the pole barn made possible by the use of treated poles set directly in the ground and forming the framework for a structure (Fig. 2). These pole barns can be constructed at a minimum cost and provide a maximum of shelter. Pole barns are finding use not only on the farm but in lumber yards, where it has been found desirable to roof lumber piles, and in many other types of warehouses and storage buildings.

The use of pine and hardwoods in the cooperage industry has been tremendously important in the past but is losing ground to other types of containers. In fact, it is becoming increasingly difficult to find nail kegs and various other types of cooperage containers formerly very common. Since the distillers have found no substitute for aging bourbon, however, the use of white oak for cooperage is still most important and the companies making whiskey barrels are constantly on the lookout for good white oak.

A new hope for the large-scale utilization of low-grade hardwood is the revived charcoal industry. The recent trend to outdoor cooking and the broiling of steaks over charcoal fires has skyrocketed the demand for charcoal so that existing industries cannot supply the demand. As a result, numerous small charcoal industries have sprung up all over the South, and large briquetting plants have been installed at several locations. It seems that charcoal is going to be

Fig. 1.—"Savannah Oak" plywood panelling produced from swamp oak formerly considered low grade.

Georgia Pacific Plywood Co. photo.

Fig. 2.—Pole structures are becoming common on the southern landscape. They provide long life, easy construction, and low cost.

U. S. Forest Service photo.

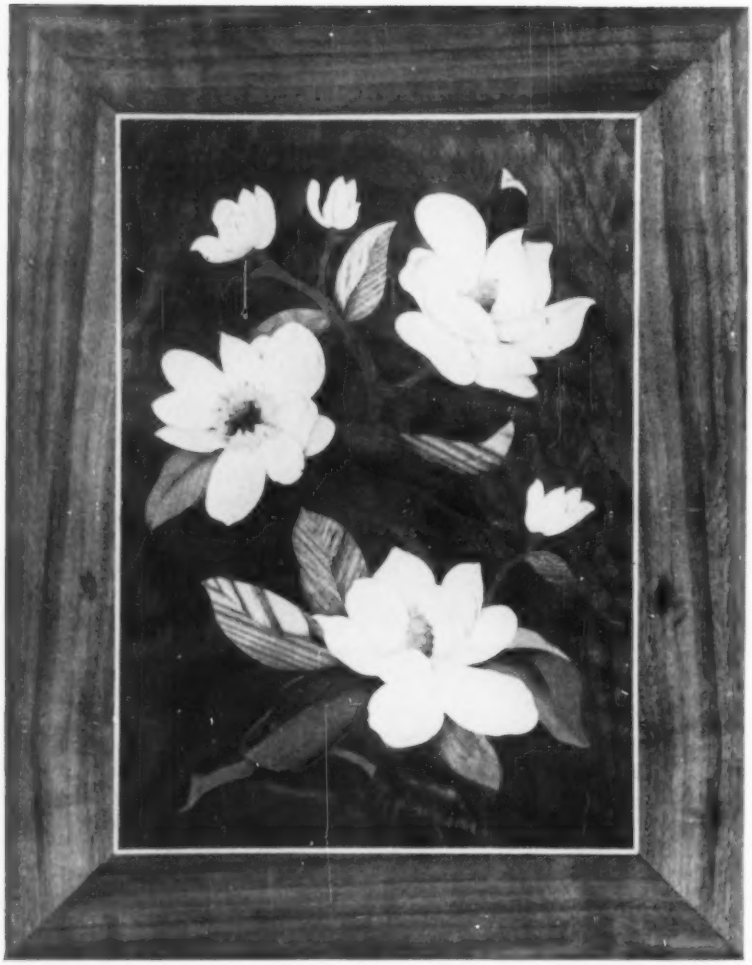

FIG. 3.—Wood marquetry by William Bader, Asheville, N. C. All species are carefully worked into an item of beauty.

U. S. Forest Service photo.

a potent factor in the silvicultural improvement of southern forests in the next decade, and already the trend is for small operators to use portable kilns near the source of supply and then sell lump charcoal wholesale to briquette manufacturers who process and market the material.

Among the important specialty items manufactured from pine and hardwood are handles for such articles as axes and brooms. Hickory is still king among woods used as handles in striking tools, but procurement has become more difficult. The old requirement that hickory handle stock must be white wood has been largely abandoned, and producers are now accepting red hickory as readily as white, since they too have learned that density, not color, is the measure of quality.

The southern textile industry still makes fairly heavy demands on wood products. Although attempts have been made to find substitutes for hickory picker sticks and dogwood shuttles, the only successes along these lines have been laminated wood or compressed wood products rather than a change to metal or glass laminates. Picker sticks on each side of the loom drive the shuttle back and forth 150 to 300 times per minute. Dogwood and hickory withstand this terrific impact continuing 24 hours a day in the textile mills, but competitive products break down from fatigue or lack of resilience. Likewise, most bobbins in textile mills are made from maple, and although some satisfactory substitutes have been made from paper materials and compressed wood fiber, wood in some form continues to maintain its dominance in this field.

In sporting goods, wood also dominates, with items such as skis of finest hickory; baseball bats, formerly made entirely of ash but now frequently laminated with hickory into a superior bat; javelin staves made from ash; archery equipment made from osage orange, hickory, ash, lemonwood, and many other species; and a great variety of toys that employ practically all species of hardwoods and softwoods, and vary from rough unfinished articles to highly finished and polished items.

Innumerable wood specialties make small demands on wood supply but big demands on labor. Such items are wood carvings, turned lamps and candlesticks, and wood marquetry, which is inlay work with fancy veneers to develop pictures or moulding patterns from wood. Wood marquetry is an almost lost art that has been coming back in recent years as a result of renewed interest in natural wood finishes in the home (Fig. 3). Carvings by Cherokee Indians and Appalachian mountaineers, who use holly, walnut, cherry, and other native hardwoods, are approaching big business in certain local areas, although the trade is insignificant in relation to total wood use. Strangely enough, the use of wood for artistic purposes will solve few silvicultural problems, but the appreciation of conservation practices and good utilization practices is much more common in areas where wood artistry prevails.

New waterproof and durable glues make it possible to join together sheets of paper-thin veneer edge to edge or laminated timbers several feet thick and hundreds of feet long. New combinations of paper and veneer, or paper and lumber have minimized problems of shrinkage and swelling so that products of exacting requirements can be developed. Research in fireproofing chemicals and new wood preservatives shows promise of

products from wood that can withstand competition from competing products—ceramic or metal.

Results of recent research can be seen in the booming particle board business in the South. Whereas all chipboard plants in the South could be counted on the fingers of one hand two years ago, there are now 25 or more such plants, with an equal number under construction or planned. Particle board is versatile and is gaining acceptability as a finished panel, as corestock, as an insulating material, or as an underlayment, and its advocates hope to find it a place as a structural material. It is readily made from any species, with or without bark, and in small or large quantities.

Statistics show that the per capita use of *lumber* has decreased during past years and will probably continue to decrease in the future. But the total use of *wood* per capita has not decreased; in fact it gives promise of increasing as the ingenuity of man develops new products and processes.

Because of all these things, the successful forester of the future will be one who considers the total potential of the tree for its many and varied uses rather than a single use.

Progress of Protection from Forest Fires in the South

James E. Mixon
State Forester,
Louisiana Forestry Commission,
Baton Rouge

The American businessman looks back to the year 1933 with horror. The free enterprise system as he knew it almost came to a complete end that year and, although he wasn't put completely out of business, his stature was seriously reduced.

Be that as it may, my grandmother's favorite saying that "every cloud has a silver lining" certainly rang true, for the year 1933 was a banner year for forestry in America and especially in the South. At a time when dreams were being smashed for many Americans, the forester's dream in the South was just coming true—for more reasons than one.

In 1933, Arkansas decided to set up a forestry department and became the last state in the South to place its forest lands under some kind of protection. This occasion marked the end of a long South-wide struggle that dated back to 1905 when North Carolina established the first southern state forestry service. Prior to that time, no system of forest protection, either organized or unorganized, had ever been devised for fighting fires in the woods except by settlers who were interested only in protecting their homes and would beat out the flames with pine tops.

Lack of interest in forest fire protection was only natural, of course, because forest areas were extensive and timber and land prices were so low that it didn't pay a landowner to spend money on such a program. Coupled with this, fires in the South were already an established practice in the vast forested area found here by the first white settler. Early explorers such as William Bartram reported in 1772 that fires were set by Indians to corral game. The early settlers used fire to clear ground and to burn up surplus timber. Cattlemen burned (and still do) to remove the accumulated rough and improve grazing for cattle. In fact, it seems that everyone burned the woods for one reason or another. As late as 1925, when some efforts were already underway to control and prevent wildfires, more than 40 million acres were being burned annually and virtually no area had been free of fire for longer than five years in a row.

Prior to 1905, the only concrete attempt to prevent fires occurred in North Carolina about the time of the Declaration of Independence, for it was about then that measures were drawn up to cope with indiscriminate woods burning through the media of the law. This early start, along with their subsequent pioneering in the field of forest protection, may be one reason that today North Carolina has the lowest number of arson fires in the South. Only 17 percent of North Carolina's fires are attributed to arson, while Oklahoma's record is about 70 percent.

During the almost 30 ensuing years after North Carolina's jump-off into the forest protection field, progress in southern forestry was slow. Most of our fire prevention and control remained on paper and in the visions of far-seeing men too few in number. The professional forester was an uncommon species in the South, both within the timber industry and certainly within state forestry organizations. The industry in general held with the idea that a local and practical "country boy" properly indoctrinated with the spirit of fire prevention proved more effective than "them college woodsmen." Statewise, it seems that "them college woodsmen" didn't get much education in civics, and therefore just didn't understand or couldn't cope with traditional Southern politics on a continuing basis.

So it was 1915 before the second state, Texas, formed a forestry department and 1918 before Louisiana joined the effort. Eight other states followed during the 1920's and Arkansas came in during 1933.

As pointed out before, the early leaders were few. Some of them

were Henry Hardtner, president of the Urania Lumber Company in Louisiana; Alex Sessons of Cogdell, Georgia; Posey Howell of Howison, Mississippi; Austin Cary of the U. S. Forest Service who so ably spread the gospel of forest protection across the South; and, of course, Dr. H. H. Chapman of Yale.

In that 30-year period, some measures of fire-fighting were put into effect by the young and ineffective state forestry agencies. Some landowners in the South with contiguous properties banded together and set up protection organizations, including fire lookout towers, and were able to decrease the acreage loss on such concentrated acreage noticeably.

Stimulating the interest in forest fire protection during the 1920's was the advent of the pulp and paper mills in the South. With them came a demand for the young, pulp-size trees which meant an early return on the forest landowner's timber investment. This encouraged the landowner to plant trees, which he did, and opened up the demand for pine tree nurseries which soon spread all over the South. But more important it put a good price on timber and gave the forest conservationist a talking point he had never possessed before.

Talk and interest in fire prevention and control gained in popularity, too, through the efforts of the American Forestry Association who sponsored the now famous fire prevention caravan. It can be safely stated that this was the first mass effort toward the solution of the South's woodland fire problem. Roaming the backwoods of the South in 1928, the caravan's unreliable trucks and cranky "picture machines" awakened thousands of rural people for the first time to the value of the forests around them.

All the toil and sweat expended in overcoming the inertia of the South's forest protection machine was not in vain. Through the efforts of a few Southerners during the first quarter-century, the South was ready to cash in when the most important event in the annals of Southern forestry crashed on the scene in 1933: organization of the Civilian Conservation Corps.

When the Corps was organized all over the country, legions of teen-age boys were drafted into forestry work. State foresters became well-known as chief administrators of this program and millions of Americans began to sense the real meaning of the term forestry. It marked the beginning of modern-day forestry, especially in the South

Shortly after these legions entered the forests of the South, a remarkable strengthening of state forest agencies occurred because the forester was the logical person to manage the program. It seemed that, all at once, the struggling landowner, the frustrated state forestry departments, and the undernourished United States Forest Service bloomed in the sunshine of national prominence.

The South, especially that portion which is now considered Region Eight, got its share of CCC units, composed of ablebodied men banded together for employment in forest management and improvement work. It would be impossible to compute the value of these men's work as related to the millions of miles of country and woods roads constructed, the number of bridges built, the untold thousands of miles of whoop and holler country telephone lines strung and the multitude of fire lookout towers raised above the tree tops, let alone the billions upon billions of hours expended fighting the millions of forest fires which sprang up from 1933 to 1942, when the CCC was officially concluded.

When the CCC was organized, only about 45 million acres of forest land were under organized protection and the area burned in protected forests amounted to 4.2 percent, or four acres in a hundred (although this represented much progress up to date). When the CCC was disbanded in 1942, there were 84 million acres of forest lands under protection, and the average area burned amounted to only 2.8 acres in a hundred.

Not long after the millions of man-hours had been expended by the CCC on forest management work, results were clearly visible. When unburned areas began to sprout trees to supplant barrenness and millions of hand-planted trees began to show up, the landowner began to see the change and possibilities. He began to seek more trained foresters to manage his land and the state forestry agencies began to overlook political appointees in favor of the professionally trained forester. The forest landowner and forest industry began to appreciate that the forester was good for something besides running approximate land lines and measuring the volume of logs after they were cut. Soon, they found to their amazement that the forester could tell them when, what, and how many trees to cut in order to make the best profit (a word with a touch-and-go meaning of reality in the South until almost the end of the 1930's). And accompanying this rise in stature of the professional forester was the increase in enrollment experienced by gasping forestry schools of the South. With the interest rising in forestry, southern schools were soon graduating dozens or more, where before their graduating classes weren't large enough to make up a poker game.

As might be expected, the increase in forest protection was responsible for a corresponding improvement in fire-fighting methods. The basic concept of fire fighting in the South from the beginning of the effort was a direct attack on the small fire with a fire rake and a fire flap, the latter consisting of a piece of heavy belting securely fastened to a hoe handle. The flap was the more widely used of the two for many years because it was light and easily transported on muleback.

Seldom were more than two men to be found combatting a fire with these limited forest fire-fighting tools. When the fire was of larger size, the indirect method of attack was used, with the two men finding the nearest road, trail, or creek and backfiring a few hundred feet

or a mile beyond the head of the fire, depending upon the wind, fire size, and location.

Mop-up operations were seldom heard of, primarily because when the fire was out, it was either raining or the fire fighters were too exhausted to do anything but go home and hope it wouldn't break out again. With the CCC came not much improvement in tools but certainly more men to use them and rapid truck transportation to the scene of the fires. Many persons maintain that the number of fires did not decrease during the CCC days, but all readily admit that the number of acres burned annually decreased. Naturally it had to change with well-trained and supervised men hitting the fire line where once only a couple of men were there.

Later backpack pumps came into use, along with more trucks to carry water storage tanks, but the direct attack by the water system was short-lived. It became difficult to reach the actual scene of the fire because heavy tree growth and underbrush impeded travel. Too, trucks mired up easily after light rains had fallen. One of the first pieces of equipment devised for the indirect attack on forest fires was the Arkansas plow which was hooked onto the front of the tractor. After the war, jeeps were used and many are still in use today to pull plows in areas where heavy equipment is not mandatory. Drouths since the war have necessitated more and more hydraulic mechanisms on plows in order to dig the plow point into stubborn, dry crusts.

The late 1930's saw the rise of two important fire prevention and control factors. First was the matter of communications. Any communications system that existed before that time consisted of old-fashioned grounded telephone line (single wire) which resembled more than anything else a one-strand barbed wire fence without the barbs. That gave way to the metallic line of two wires with fancy insulators, perfect when it worked but requiring far more skill to maintain. Use of radios came into the picture during this period also. It is believed that Florida was one of the first Southern states to use radio as a communications element between rolling stock and dispatcher stations. Florida's Ranger Ray Atkinson was a "ham" and he built and put into service Florida's first two-way radio. It was somewhat crude, noisy, and not too reliable under certain atmospheric conditions, but it worked. Today, telephone systems have become the secondary form of communications, with all state forestry departments wondering how they ever got along without two-way radios.

A recollection of the South's forest protection progress wouldn't be complete without brief mention of prescribed burning and its slow but sure acceptance in the South as a fire control tool. Dr. H. H. Chapman of Yale was a pioneer in this development, as were Austin Cary and others, including Frank Albert of the U. S. Forest Service. I remember back in the middle 30's that some landowners were trying it out on an experimental basis in north Florida and Georgia, and the rumor that it worked was gradually spreading throughout the South.

When landowners of Florida first started experimenting with prescribed burning, the U. S. Forest Service was outright opposed to the idea and even threatened to withhold CM-2 funds from the Florida Forest Service if landowners didn't discontinue the practice. And they meant it, too. I recall one day on my way to work I stopped the car to observe one of the landowners scraping the blackened bark off his trees. When I asked why he was doing that, he informed me that the U. S. Forest Service was sending a team of inspectors down the next day to check on the prescribed burning in the area and he wanted to get rid of the telltale blackened bark where his prescribed burn got too hot!

The U. S. Forest Service policy later was altered to the extent that they allowed it but wouldn't approve the use of CM-2 funds for such practices. Proof of the value of prescribed burning steadily mounted, however, and the federal service has since gone so far as to approve use of CM-2 funds for this work.

An up-to-date attitude on prescribed burning can be seen by the opening remarks of State Forester Guyton DeLoach of Georgia at a meeting recently:

"I have been dreading this for a long time. It has been more or less my policy in the past few years to stay clear of prescribed burning. We have recognized the need for it and the importance of it when done right, but, frankly, we didn't have enough knowledge about it to get out and to do too much preaching on it, and we were afraid what little we did do would be taken wrong by the small landowner. However, we are going to have to get into prescribed burning because of the serious fire situation over the past year or two. As you know, we have lost considerable acreage in southeast Georgia. We are going to have more prescribed burning in the future as a safety measure to prevent disastrous fires such as we have had."

So far I have noted several main events which I class as the most important in the history of Southern forest protection: (1) the American Forestry Association's fire-prevention caravan; (2) advent of pulp mills in the South; (3) organization of Southern state forestry departments; and (4) the start of the Civilian Conservation Corps. If I had to pick another event which ranks with these in importance, I would name the organization of the Southern Forest Fire Control Chiefs in 1940. It became apparent to the state forestry agencies about that time that something had to be done to continue the momentum of effort on forest protection stirred up by the CCC, which was soon to be disbanded. They knew that, with the absence of the CCC manpower, forest protection of the future would have to depend upon more mechanized equipment, so the fire control chiefs met together for the first time in August 1940 in Lake City, Florida. Annually since that time

except during the war years these conferences have been responsible for valuable exchange of ideas and the development of protection equipment as we know it today.

And just where are we today? Have we progressed? I think the answer, certainly, is yes. We have cut the size of fires down to an unbelievable figure through the use of more and better equipment by both state and industry crews that can hit faster and more often than any fire fighting force ever conceived in this country. This is true, however, only on our protected acreage, which amounts now to 140 million acres in the South, or 82 percent of the total forest area. That means that we must place 33 million more acres of forest lands under protection in order to complete the job, all but seven percent of which are privately owned. (Today, only Alabama and South Carolina have 100 percent protection of forest lands.) We must renew with vigor a concerted drive for fire prevention which, in my opinion, will not be successful without more attention to a stiff enforcement program to rid the South of its wood arsonists. Today we are on the threshold of becoming the forestry leader of the world but, paradoxically, are doing little, by comparison to our protection efforts, to overcome our fire prevention and enforcement problems. We have 136,000 forest fires a year and 40 percent of these fires are started on purpose. We have 77 percent of the nation's forest fires and 92 percent of the nation's incendiary fires.

TABLE 1.—NUMBER OF FIRES: 1952 THRU 1954[1]

	Total	Incendiary	Percent
Alabama	31,459	10,856	34.6
Arkansas	21,049	8,441	39.8
Florida	27,022	15,239	56.8
Georgia	32,932	9,902	31.3
Louisiana	30,068	17,938	59.9
Mississippi	36,380	18,165	49.7
North Carolina	11,652	2,083	17.8
Oklahoma	3,424	2,397	69.8
South Carolina	18,761	7,339	39.1
Tennessee	15,516	5,031	31.1
Texas	9,835	2,630	25.3
Totals	238,098	100,021	Avg. 42.2

[1]From U. S. Forest Service records for Southern Region.

The turning point to this situation could well have been reached in New Orleans on April 13 of this year when the Southern Forest Fire Prevention Conference convened with more than 1200 sheriffs, district attorneys, forest landowners, judges, and other citizens in attendance. During the past 15 years, I know of no other event which shows as much promise of becoming the fifth most important milestone in Southern forest protection as does the New Orleans conference.

Another problem facing us in the future is continued drouths. There is a growing feeling among state foresters that our fire control methods become outmoded during periods of long drouth such as we have experienced during the past few years. This is borne out by the tremendous acreage losses suffered in the Southeast this year. The manpower was there and the equipment was there, but they couldn't control the fires. Greater emphasis on fire research is called for in order to find the answer to such fires. We must go into this research, too, with open minds and not rule out any possibilities for experimentation, however fantastic they may be.

There is one thing we do know. It will take something fantastic to solve the South's fantastic fire problem of today.

Deadline for Consultants Listing

Consulting foresters who wish to have their names included in the Directory of Consulting Foresters, to be published in the January 1957 JOURNAL OF FORESTRY, should apply to the Society office not later than November 1, 1956. Information supplied should follow the form used in the directory published in the January 1956 JOURNAL.

Consultants whose listings appeared in the previous directory and who have not returned inquiry cards mailed in September, should do so at once.

Progress in Forest Entomology in the South

L. W. Orr and R. J. Kowal
Chiefs, Divisions of Forest Insect Research,
Southern and Southeastern Forest Experiment Stations,
Forest Service,
U. S. Department of Agriculture

RECOGNITION of the South's forest insect problems has been slow to develop but is now rapidly gaining momentum. Southern timber losses are generally less spectacular than those in most other sections of the country and the tendency has been to ignore them. During the last eight or ten years, however, foresters and timber owners have begun to realize that insects are responsible for a large amount of mortality, growth loss, and degrade, even during periods when there are no severe outbreaks.

Rising prices for timber and timber land, employment of a large number of technical foresters, intensification of forestry practices, and increasing competition for present and future supplies of timber are some of the factors responsible for this growing awareness of our insect problems. The Timber Resource Review places great emphasis on the need for reducing losses from destructive agents. The South is expected to produce at least half of the Nation's timber in the future, and insects can easily prove to be a limiting factor in reaching this goal.

Products Insects

A large part of the forest insect research that has been conducted in the South has been concerned with insect species that attack forest products. Under southern conditions, such insects do rapid and extensive damage.

Much has been learned about the control of termites, powder-post beetles, ambrosia bettles, and other insects that attack logs, pulpwood, lumber, and finished products. The findings have been widely applied, not only in this country but in other parts of the world. This is all to the good, since one important means of insuring an ample supply of timber to meet future needs is to protect lumber and other wood products that are already in use. The studies should be continued and expanded, for new problems are constantly arising. For example, the recent prevalence of slab-on-ground construction in new housing has created many new difficulties in termite control. The increasing use of second-growth timber for lumber has favored certain wood-boring insects that work in sapwood. Insects and associated fungi cause rapid deterioration of the huge quantities of pulpwood that are now held in reserve at most pulp mills.

Because of the need for concentrating earlier research on forest products insects there is a lack of information on the biology and habits of nearly all of the many insect species that attack southern forest trees. To some extent, research done in other parts of the country can be adapted to southern problems. A notable example is the techniques developed in the North and West for airplane spraying to control defoliating insects. By and large, however, southern forest entomologists must conduct original research on all aspects of the biology and behavior of destructive insects in relation to their environment, and then lead into control.

Insects Hinder Forest Regeneration

The South has over 20 million acres in need of planting to forest trees. With prospects for a greatly expanded planting program and more intensive management to insure regeneration of harvested stands, insect damage to tree seeds and young seedlings will be of critical importance. Protection of seed crops, especially in stands set aside for seed production, will obviously be necessary. Forest geneticists often lose much of their painstaking work because of insect damage to artificially pollinated cones or grafted breeding stock. Recent experiments at the Southern Institute of Forest Genetics suggest that spraying with BHC (benzene hexachloride) may be a practical method of controlling the insects that damage pine cones. There is, however, still much to be learned about the life histories and habits of the various insects before intelligent recommendations can be made as to the proper timing of the treatments. It will also be necessary to test various types of equipment, including aircraft, for spraying seed orchards.

White grubs, cutworms, scales, aphids, leaf-cutting ants, tip moths, weevils, and sawflies attack seedlings in nurseries and plantations. Reasonably effective controls are available for some of these pests but need to be improved. Other species have received very little attention; among these, the weevils and tip moths now appear to be the most troublesome.

The pales weevil, which girdles young conifers, has long been recognized in the Northeast as a serious obstacle to the successful planting of pines immediately following logging or severe burns. During the last ten years this weevil, and perhaps two related species, has caused many planting failures in the South; often these failures have been attributed to drought. Experiments are now being conducted in the use of insecticides to protect newly planted seedlings. Preliminary results are very encouraging. The effects of season of cutting are also being studied in relation to the development of weevil populations and the period of time that must elapse

before a logged or burned area can be planted safely.

Tip moths are especially troublesome in plantations of loblolly and shortleaf pine. The insects kill the new leaders and branch tips. Heavy infestations result in "cabbage-tops" that make very little height growth, thus adding several years to the period required to produce a crop of pulpwood or saw timber. Damage is most severe on sites not well adapted to these tree species but is not limited to such sites. DDT sprays have given fairly good control but must be repeated at least yearly until the trees are about 15 feet high and no longer so subject to attack; unfortunately, this treatment may cause a build-up of mite populations and consequent damage. Tests are now being conducted to evaluate different insecticides and to determine the most effective timing of spray applications. Genetics studies aimed at developing pines resistant to tip moths are also under way.

Defoliators Reduce Tree Growth

Defoliators have been less destructive in the South than in most other sections of the country. Nevertheless, such species as the loblolly pine sawfly, red-headed pine sawfly, pine colaspis beetle, cypress looper, forest tent caterpillar, and cottonwood leaf beetle are a constant threat, at least to the extent of causing sharp reductions in growth of defoliated stands. Growth loss is becoming of greater concern to many timber owners because it may upset cutting budgets based upon relatively short rotations. Airplane spraying to control the loblolly pine sawfly has been done in several areas, and it is likely that similar control operations will be necessary for other defoliators in future years.

Bark Beetles the Most Important Killers

Bark beetles have been responsible for killing large volumes of pine timber in the South. The problem will become increasingly acute because pine stands on vast areas are now approaching an age when they will be more subject to attack.

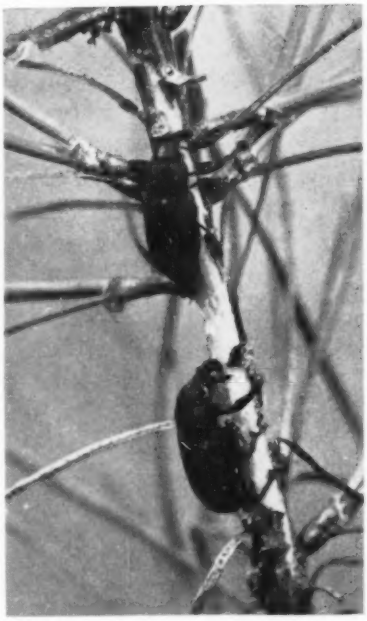

FIG. 1.—The pales weevil, the adults of which girdle and kill young pines, is a serious pest where planting follows logging or a severe burn. It is particularly troublesome to the increasing number of southern foresters who want to clearcut and plant.

Southern pine beetle outbreaks in Texas, Mississippi, Alabama, Tennessee, North Carolina, South Carolina, and Virginia during the last seven or eight years have killed many millions of board feet. This insect was studied in considerable detail some thirty years ago and also more recently, but there are still many puzzling features about its behavior and the conditions that favor the development of outbreaks or sometimes bring them to a sudden end. It is generally believed that droughts are likely to be followed by outbreaks but it is evident that other factors must also be involved. Stand age and density, disturbances by fire, wind, or hail, and changes in the relationship of the beetles to their natural enemies may all play a part.

Ips engraver beetles, although they seldom kill solid blocks of timber as does the southern pine beetle, are a more or less constant problem throughout the South and actually may be associated with the loss of more timber than is killed by the southern pine beetle. The fact that Ips beetles usually kill only single trees or small groups makes salvage and control very expensive and difficult. The cumulative loss is much more than generally realized, as has been found true by the few timber owners who have established a systematic salvage program.

The black turpentine beetle is a major problem in naval stores areas and in many selectively logged stands. This insect appears to have changed its habits in recent years and is now much more aggressive in its attack on living trees. Selective logging, especially on flat, poorly drained sites, is likely to be followed by loss of part of the reserve stand to beetles that develop in the green stumps. Mechanical injury to trees and tree roots by heavy logging equipment is evidently an important contributing factor in such losses. Outbreaks almost always follow severe fires and epidemics of other bark beetles.

Much of the recent research on southern bark beetles has been in developing and testing methods of control. The importance of prompt salvage of beetle-infested trees has been stressed. Various insecticides have been tested for use on infested trees that cannot be salvaged, for spraying infested stumps and slash, and for spraying the bases of green trees to prevent or check attacks by the black turpentine beetle. A fuel oil solution containing 0.25 to 1.0 percent of the gamma isomer of benzene hexachloride is the most effective and practical spray for these purposes. The 0.25 percent concentration is generally used for the southern pine beetle and Ips, but a 0.5 or 1.0 percent concentration is required for the black turpentine beetle because of the thicker bark at the base of trees and because a longer residual action is necessary.

Hardwood Insects Cause Great Loss

Hardwoods make up about 47 percent of the saw timber volume

Fig. 2.—In recent years, the black turpentine beetle (Left) has come to be regarded as one of the most destructive insect enemies of southern pine. The most obvious signs of its presence are large pitch tubes (Right) on the lower bole.

and 55 percent of the growing stock volume in the South. Few people, even among foresters, realize the amount of damage caused by insects that infest hardwood timber. Tree mortality is less prevalent than in pine stands, but borers of various types cause tremendous loss in value by making holes and scars in living trees. Thousands of acres of hardwood stands that would otherwise produce large volumes of high-quality products are rendered almost worthless by these insect-caused defects. This creates the very difficult problem of how to remove the defective trees and replace them with a crop of high-quality timber. If the trees were actually killed by the insects, as is the case with some of the insects that affect pine, the problem might be simpler because the space would soon be reoccupied by regeneration. At present very little is known either about the insects themselves or the conditions that make trees susceptible to their attack. Studies are under way to learn more about the insects and the defects they cause. An immediate objective is to define the external symptoms of insect infestation so that foresters and timber markers can readily identify defective trees. Later studies will emphasize cultural and management practices that will help to make hardwood stands more resistant to insects.

Insect Surveys and Control

In recent years marked progress has been made in obtaining more adequate information on the current status of forest insect infestations and in applying control measures.

Aerial and ground surveys are conducted in areas where insect outbreaks are anticipated or reported. Present facilities are far from adequate to permit even extensive annual coverage of all of the 178 million acres of commercial forest land in the South by federal forest entomologists. Cooperators must be depended upon for initial reports of most infestations, and many individuals and agencies are taking part in this work. The Forest Pest Action Committees that have been organized in several states are very helpful in conducting detection surveys and in securing the necessary cooperation for planning and applying control measures.

Information from all sources is assembled and interpreted at the Southern and Southeastern Forest Experiment Stations and periodically distributed by means of the *Southern Forest Pest Reporter* and the *Southeastern Forest Insect and Disease Newsletter*, both of which are available upon request. Several of the state forestry agencies are gathering and distributing similar information. Training schools are teaching foresters and other woods workers the identification and control of the important forest insects in each area.

Federal funds appropriated under authority of the Forest Pest Control Act of 1947 are now available for controlling outbreaks on federal land and, under certain conditions, for cooperative assistance on state and private land. Large-scale cooperative projects have been conducted for control of the southern pine beetle outbreaks in Mississippi, Alabama, North Carolina, and Tennessee. Unfortunately, some of the southern states still do not have legislation which will permit them to cooperate with private landowners and the federal government on similar projects.

Many of the larger companies constantly watch for insect infestations and act promptly to control them. By contrast, the small landowner is seldom much interested or cannot afford to spend money for doing control work. Insect suppression is rarely effective unless applied on all lands in the infested area. A tremendous job is ahead in acquainting the public, and especially the small landowners, with the more important insect problems.

Several states and large companies in the South now have forest entomologists on their staffs, and it is likely that others will be employed as soon as suitably trained men become available.

This is a very encouraging development, indicating a growing awareness of the importance of this phase of forest protection.

Probable Trends

There is urgent need to learn more about the biologies and habits of all forest insects. This information is basic to research on methods of preventing or controlling outbreaks. Such studies are too often neglected because of pressure to find direct control measures for emergency situations. Research is also needed to determine how insect populations are influenced by parasites, predators, diseases, drought, ice and wind storms, site quality, stand density and composition, logging operations, and cultural practices. These studies are long-term in nature and will require the combined efforts of specialists in several related fields of research. The results should be of great value in developing forest management practices that will aid in preventing insect outbreaks, in recognizing impending outbreaks, and in deciding when direct control measures should be applied or discontinued.

Direct control measures, although their effects are usually temporary, will continue to be necessary. They should, however, be considered as emergency actions to cope with situations that develop in spite of the best forestry practices that can be applied. The constant objective of southern entomologists should be to learn how to grow and manage forests that are resistant to insect attack and that will require a minimum of direct control. Even so, if future experience in forestry parallels that of past developments in intensive cultivation of agricultural crops, it is likely that insect problems will become more critical and that direct control will be required more frequently than in the past. Active cooperation of all timber owners and woods workers in prompt detection of incipient outbreaks and application of control measures will become increasingly important. We believe that the next few years will be marked by rapid progress in our studies of forest insects and in reducing the losses caused by them.

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Forest Disease Research in the South

George H. Hepting
Chief,
Division of Forest Disease Research,
Southeastern Forest Experiment Station,
Forest Service,
U. S. Department of Agriculture

FOREST pathology has always been important to the South. Some of our most destructive diseases to nurseries, plantations, and natural stands are in this region. According to the Timber Resource Review, the 1952 impact of damage by diseases on the increment of timber in the South exceeded that from either fire, insects, weather, animals, or miscellaneous causes. Diseases, including the very damaging heart rots in southern hardwoods, caused the loss of nearly 2 billion cubic feet to the growing stock of the South in 1952.

Some of the earliest research in the field of forest pathology was in the South. Von Schrenk, Spaulding, and Hedgcock, among the first of America's forest pathologists, spent much time in several southern states collecting forest fungi and starting research on some diseases. Some of the problems that they tackled in the early 1900's included wood preservation, rust diseases, sap stains, mistletoe, and heart rots.

As the chestnut blight and white pine blister rust moved South, the importance of pathology to this region grew. In the late 1920's, pathologists were assigned to the Appalachian Forest Experiment Station at Asheville and to the Southern Forest Experiment Station at New Orleans. Thus a permanent and continuous program of disease research got under way in the South. Some years later, pathologists were attached to branches of these experiment stations located at Union, South Carolina; Athens and Macon, Georgia; Lake City, Florida; Gulfport and Stoneville, Mississippi. Some research on tree diseases, although in many cases a very limited amount, has also been going on at at least eight southern universities.

The following account deals with research effort and accomplishment in coping with important southern tree diseases.

Diseases of Conifers

Blister rust of white pine has now reached North Carolina on pine and Georgia on ribes. It is being kept from doing important damage in the southern Appalachians partly because white pine grows in association with ribes on only about ten percent of its range in the southern mountains and partly by an effective ribes eradication program on that ten percent. Now that this serious disease is under effective control, trials are being carried out with rust-resistant white pine and rust-resistant black currants developed by workers in other regions.

The fusiform rust is an important disease of southern pines, particularly slash and loblolly, in nurseries, plantations, and natural stands. Research showed that little could be accomplished by removing the alternate hosts (oaks) up to a quarter-mile away, but that control in the nursery could be obtained by

a Bordeaux or ferbam spray. In young stands, rust damage can be minimized by maintaining high stand density and by pruning off branches bearing cankers centered less than 15 inches from the trunk. Close spacing when planting in potentially heavy rust areas is also used to minimize ultimate rust damage.

Littleleaf affects shortleaf and to a lesser extent loblolly pine. Once littleleaf has become established, it may be necessary to harvest the stand early to avoid heavy losses. The average interval from early symptoms to death is seven years. Years of careful study have shown this disease to be the result of root damage by the soil fungus *Phytophthora cinnamomi* and adverse soil conditions. Intake of soil nutrients, primarily nitrogen, and water are reduced, and this condition produces the characteristic symptoms. High nitrogen fertilizers have checked littleleaf on individual trees and on small plots. It has been found that the main soil characteristics defining predisposition to littleleaf are erosion, plastic subsoil, shallow depth to greatly reduced permeability, and subsoil mottling. Methods of managing littleleaf stands have been worked out, based on the degree of cut in relation to severity of littleleaf. A selection and breeding program is now under way which so far indicates that resistance to littleleaf is heritable (Fig. 1).

One of the earliest forest diseases to receive much of the pathologists' attention was brown spot, a fungus disease largely of seedling longleaf and loblolly pine. Research showed that the disease could be prevented in the nursery by spraying with Bordeaux or certain other fungicides, and controlled in the field by using prescribed fire in stands of infected longleaf seedlings These measures are standard now with longleaf pine. Heavily infected longleaf seedlings are likely to stay in the grass stage for many years unless fire is used. The fire consumes the fungus-infected needles, and it generally takes at least two years for important reinfection. This is usually time enough for the longleaf seedlings to initiate height growth.

Fig. 1.—At left and in the background are shortleaf pines dead and dying of littleleaf. At right is a healthy shortleaf of the type being propagated by grafting and being bred with similar trees so that progeny can be tested for resistance to littleleaf.

Fomes pini rot, commonly called redheart, is the most important heart rot of southern pines. It is not likely to be a serious problem in the future unless stands are allowed to become overmature. Rotation ages of 70 to 80 years will not ordinarily lead to serious redheart. The fungus enters largely through large branch stubs. The commonest butt rot fungus, *Polyporus schweinitzii*, needs an injury to infect, so stands can be kept quite free of it by protection from fire and logging injury. Research has just begun on the root and butt rot fungus, *Fomes annosus*, on southern pines since it has been found causing breakover and other damage to slash, loblolly, white, and pitch pine, and eastern white-cedar. It has long been known as a serious killer of eastern redcedar.

In addition to blister rust and fusiform rust, conspicuous rusts of southern pines include the round gall rust, several needle rusts, a recently discovered stem rust of Virginia pine, and in some localities cone rust. Rusts also cause damage to eastern redcedar, and one of these is also a major disease of apple.

Research has cleared up many of the mysteries of a new pitch canker caused by *Fusarium lateritium pini*. This fungus causes heavy gum flow, often kills the part attacked, and induces pitch soak of the wood. It attacks mostly on slash, longleaf, and Virginia pine. It occurs from northern Virginia to southern Florida and has also been observed in the mountains of Haiti and may have spread north from that area. No one yet knows how this disease, so widespread over the South, spreads naturally or how serious it may become.

Nematodes and fungi cause severe losses in some southern nurseries, and this is of major concern at a time when the South is striv-

FIG. 2.—An oak wilt center in North Carolina. At left, right, and lower middle are wilt-killed trees. The large oak in the upper middle is wilting and partly defoliated.

ing for maximum seedling production. Pathologists have found that soil fumigants greatly increased the percentage of marketable pine seedlings where the nematode-fungus complex was destructive. There are outstanding instances of stimulated seedling production through soil fumigation in nurseries in Mississippi and Georgia. While damping off is not usually an important problem in southern pine nurseries, some root rots cause periodic losses unless fumigation is followed.

Diseases of Hardwoods

Chestnut made up approximately one-fourth of the saw timber in the southern Appalachians before the blight was carried from China to Long Island, N. Y., and swept southward through the entire range of the species. The best efforts of the pathologists proved futile in arresting its spread. Chestnut is now being replaced by associated species, primarily the oaks. Blight-resistant Oriental chestnuts are now available for planting, and hybrids are being bred between the Asiatic and American species to take advantage of the blight-resistance of the former and the form and nut quality of the latter.

In recent years, the oak wilt disease (Fig. 2) has moved into the South from the Middle West, and is now established in the East from Pennsylvania to North Carolina and Tennessee. A concentrated program of research is aimed at this disease on the part of several states and the federal government, and in 1955 every southern state with oak wilt inside its borders was carrying out some form of a control program against it. Now that the chestnut is gone as an economic species, the oaks are more valuable than ever, and the research and control efforts must be continued and if possible increased to ensure protection to our oaks against this disease.

Among the common southern canker diseases are the one caused by *Nectria galligena*, mostly on black walnut, northern hardwoods, and yellow-poplar, and the one caused by *Strumella coryneoidea* on oak. They occur chiefly in the mountain regions from southern Virginia northward. Research has shown that Nectria often makes only a local defect but a Strumella cankered tree is doomed to be a cull or be windthrown. Attempts to eradicate Strumella canker systematically over many years on two large areas in Maryland did not result in decreasing subsequent infections as compared with uneradicated areas.

A fungus-caused vascular wilt of persimmon has killed great numbers of trees in central Tennessee in the past 20 years and has caused some mortality in scattered localities over much of the South. This disease has not had attention for many years, so that we do not have current information on the status of its depredations. In recent years there has been a serious decline of sweetgum in parts of the South and a general dieback of oaks in parts of the Piedmont and Coastal Plain, the causes of which are still unknown.

There are many heart rots of hardwoods, with over 50 fungi causing decay in living oaks alone. Two of the worst of these are caused by *Polyporus hispidus* and *Poria spiculosa*, which not only decay the wood but cause extensive cankers as well. Most heart rot fungi need large wounds that expose heartwood or basal wounds like fire scars to become established. Such rots are therefore not common in well managed stands. In oaks of stump sprout origin, however, decay may progress from the parent stump to the new developing sprout. Research has shown this to be common if the sprout originated high on the stump, but rare if the sprout arose at or below the ground line. Low-origin sprouts should therefore be favored in stand improvement operations.

Shade Tree Diseases Also Important

Almost any forest disease can on occasion attack shade trees but, in addition, such trees have certain diseases that greatly impair their ornamental usefulness. The latter are seldom if ever important factors in the forest.

Oak leaf blister, a native disease caused by *Taphrina caerulescens*, is not a serious forest disease but is one of the worst southern shade tree diseases. It curls and kills the

foliage and makes trees unsightly. Fortunately it can be controlled by spraying, starting in the spring before the buds swell, with Bordeaux, Manzate, Orthocide 406, Microgel, or Tri-basic Copper.

Spot anthracnose of flowering dogwood is another disease primarily of a shade tree that has received the attention of the pathologists. It makes small, circular, brown spots in the leaves and bracts (petals) which sometimes fall out, leaving small holes. It also attacks young twigs. It can be controlled by spraying three or four times with Bordeaux (4-4-100), Manzate, or Orthocide, ten days apart, starting just before the trees bloom.

Sycamore anthracnose becomes so severe in occasional years that the trees are almost completely defoliated. Repeated spraying with a fungicide, starting before the buds break, is recommended.

Fusarium wilt has taken a tremendous toll of mimosa trees in hundreds of southern cities and towns, wiping out this lovely tree in many places. Pathologists have discovered, multiplied, and tested selections of this species that are wilt-resistant, and have turned over to the nursery trade two of these strains so that they are now available to the public.

Both the Dutch elm disease and elm phloem necrosis occur in a few localities in the South.

Other shade tree diseases could be mentioned, but the above will serve as illustrations of progress that the pathologist has made in this field.

Research in Diseases of Forest Products

To a considerable extent, the same team that has been engaged in the study of tree diseases has also tackled the problem of sapstain and decay of logs, lumber, and forest products, but not at the same time. The small group of men who moved into the products pathology field have distinguished themselves by their progress. At least 3 billion board feet of lumber are estimated to be dipped annually in sapstain control solutions in the South alone, and log treatments against stain and decay are on the increase.

In connection with decay in buildings, control measures have been developed for the spectacular "dry rot" caused by *Poria incrassata*, and it has been found that on-the-job preservative treatments can at least triple the service life of such exterior millwork in the South as porch floorings, steps, rails, etc. Factors that play an important part in decay of southern frame buildings have been ferreted out, such as amount of roof overhang, type of sheathing paper used under the siding, and placement of corner boards. Decay in subfloor timbers in basementless houses is not unusual in the South. It has been shown that the use of simple soil covers as moisture barriers under such houses is very effective in reducing wood moisture to levels too low for decay.

Pathologists have recently discovered that ordinary mold infection increases the permeability of wood to liquids, and that this might explain some of the great variability in preservative treatment results, and suggest means for avoiding it. The relation of permeability to fungus infection also might be made use of in treating species ordinarily difficult to treat.

The rate of decay of southern pine pulpwood has been studied, and the factors leading to high and low storage losses determined. The research pathologist has also been of considerable service to the military and naval branches of the government wherever wood has been used out-of-doors.

Although much progress has been made, the problems in products pathology are by no means completely solved. As little-used species and lower quality material have become more important, defect problems not studied heretofore have arisen, such as a perplexing stain of red oak lumber, increasing use of decay-susceptible sapwood, and changes in architectural design that increase the decay hazard in many buildings.

The forest and forest products pathologists will continue to be closely allied in their work, mainly because they both work with wood and, to a considerable extent, with fungi. They require similar training, utilize many of the same research contacts, and are often of much help to each other. It is likely that progress in forest pathology and products pathology will go hand in hand, as has been the pattern in the South in the past.

Problems in Forest Pathology in the South

Many of the most pressing problems in forest pathology in the South have been worked out, but even more remain challenges to us. With few exceptions we know the causes of our main southern tree diseases, and where pathogens are involved we know most of their life histories. The rate of decay of many heart rot fungi has been determined. We know the conditions that lead to many diseases, and control measures or measures for avoiding them have been worked out for some of the most important, such as blister rust, heart rots, nursery nematodes, fusiform rust, and brown spot.

However, we failed to control the chestnut blight, have only part of the answers to littleleaf and oak wilt, no proven control for Nectria or Strumella cankers, *Fomes annosus* root rot, pitch canker, leaf blights of Arizona cypress, and some other diseases.

We do not know the cause of the widespread and somewhat alarming dying or sweetgum, in spite of considerable research on the problem. We lack knowledge about some of our nursery diseases. The control measures available for some of our forest diseases such as brown spot and fusiform rust are imperfect or too expensive. There are major gaps in the life histories of some fungi such as those causing oak wilt and pitch canker. Another major field of work before us is to select and breed for resistance to several diseases in order to provide immune or highly resistant planting stock. A beginning has

been made in this phase with chestnut against blight, mimosa against wilt, white pine against blister rust, and hard pines against fusiform rust and littleleaf.

There are about 13 federal professional pathologists working on forest and forest products diseases in the South. In addition, seven professors teach forest pathology in southern colleges and some of these men or their coworkers do some research in this field. However, even more research workers are needed to hasten the solution of some of our more pressing tree disease problems.

Within recent years, intensified surveys for tree diseases have been carried out in parts of the South, and these have greatly increased our information on the location of important disease problems. The stepped-up survey program is leading to more effective control in the case of oak wilt, and to better knowledge of the damage being caused by diseases for which surveys have been conducted.

We are making good progress in forest pathology in the South, but would welcome more research workers to this field. There is no doubt that the solution of more of our disease problems will make the production of nursery stock cheaper and more certain, and raise the level of silviculture in our plantations and natural stands. We must look forward to the reduction of most forest diseases by adjustments in silviculture, since direct measures of control will often be too expensive.

The field of pathology in the South, to grow healthily and to make its greatest contribution, must be associated closely with many other fields of research. The tie-in with silviculture has been mentioned and is basic, and close relations with the field of entomology are essential since so many diseases are carried by insects or the infection courts are provided by insects. Most of the fundamental plant sciences sooner or later play a major role in disease research. Progress in pathology at the two federal forest experiment stations in the South has been stimulated by close working relations between pathologists and foresters, entomologists, geneticists, statisticians, and workers in other fields, as well as through the utilization of forest areas and facilities jointly serving several fields.

Many years ago most scientists had a penchant for working alone or with a small team insulated from the rest of the technical world. Today pathologists, like others in the forest sciences, are doing more of their work cooperatively with others sometimes in the same field but in a different institution and sometimes in a different field. The cooperative system has clear advantages in putting more money, facilities, and talent on a problem, and in making for more fluid interchange of information. A glance at the future of forest pathology in the South leads to the prediction of more cooperative effort and better financing, with the state services and universities taking a more important role in tree disease research.

Common Names for Cultivated Varieties of Trees and Other Plants

Forestry is being represented in the International Commission for the Nomenclature of Cultivated Plants, recently organized to provide rules for common names of cultivated varieties of plants and for the international registration of varietal names. The International Union of Biological Sciences is sponsoring this Commission, of which Dr. Roger de Vilmorin, of Paris, is chairman. There are eight members each from horticulture, agriculture, and forestry. Elbert H. Little, of the U. S. Forest Service, a member of the Tree Nomenclature Committee of the Society of American Foresters, has accepted an invitation to serve on the committee as one of those representing forestry.

The first meeting of this Commission will be held November 21 to 23 at the headquarters of the Botanical Section of I.U.B.S. at Utrecht, Netherlands. Revision of the "International Code of Nomenclature for Cultivated Plants" will be undertaken to make it equally applicable to horticultural, agricultural, and silvicultural crops. Now with the cooperation of agriculturists and foresters throughout the world, this Code is to be extended to naming cultivated varieties of plants in general.

Prepared mainly by horticulturists, and edited by William T. Stearn, this Code was approved by the International Horticultural Congress at London in 1952 and published by the Royal Horticultural Society in 1953. Copies can be obtained for 25 cents each from Dr. Donald Wyman, Arnold Arboretum, Harvard University, Jamaica Plain 30, Mass.

Though the number of cultivated varieties of forest trees is relatively small, future increase is anticipated with the expanded programs of tree breeding and forest planting. It is important, therefore, for foresters to consider now desirable alterations in the Code, so that it will be available, applicable, and widely accepted.

Dr. Little will welcome suggestions and criticism from interested individuals, institutions, and organizations for the revision and application of the International Code of Nomenclature for Cultivated Plants to forestry. Any material to be considered at the first meeting should be sent to him at the Forest Service, U. S. Department of Agriculture, Washington 25, D. C., not later than November 1. Comments for or against the use of the shortened term *cultivar* for cultivated variety will be appreciated.

Progress in Professional Education[1]

Clemens M. Kaufman
School of Forestry,
University of Florida,
Gainesville

COOPERATIVELY and individually the southern states over the last decade have devoted much thought and attention to betterment of education at all levels—elementary through university. Resulting advancements are bringing the South into a position of educational equality with other regions of the nation, lifting its educational systems out of the depths to which they had fallen following the Civil War and in the nearly half century thereafter during which the region was struggling to recover from the reverses it suffered. Understandably, forestry education has benefited from the educational uplift that is occurring.

Prior to the Civil War the South had achieved a high educational position, but the War literally brought a complete collapse. Many of its universities — Alabama, South Carolina, Tennessee, Mississippi, and North Carolina—were closed for a period of years during the Reconstruction (*5*). The history of the University of North Carolina presents a typical picture. The University of North Carolina opened in 1795 as the oldest state institution in America and had reached a high peak of prosperity before the Civil War. Closed during the Reconstruction, it reopened in 1875 to barely exist for twenty years. By 1909, 300 students were registered; plant facilities were limited (*4*). However, a few dedicated men of national renown were numbered among the faculty. In 1922 it became a member of the Association of American Universities and today is one of the great universities of the nation. In contrast, the University of Wisconsin, qualifying chiefly in name as a university at the close of the Civil War began a period of rapid growth under the impact of the Morrill Act, drawing faculty members of distinction to its campus. By the mid-eighties the University was an important center of scientific investigation and by 1902 had a registration of 3,000 students (*2*). It is one of the fourteen charter members of the Association of American Universities (*5*).

The improving educational position of the South is borne out by Table 1, which shows for 1950 that for resident enrollment in public supported institutions of higher education and expenditure by these schools the states of the Confederacy had a national position in line with their population. In these categories in 1930 they were considerably below total population level. Total resident enrollment has improved but is still below total population and population of college age.

Even though much progress has been made, higher education in some measure still lags behind other areas of the country. This lag in institutional quality is borne out by availability of the doctoral degree and the frequency with which it is awarded. The Ph.D. was first granted by Yale in 1861 (*5*). Other leading universities granted the degree in the 1870's. The University of North Carolina conferred it in 1883 and the University of Virginia in 1885; by 1900 they had conferred it seven and sixteen times respectively. During the 1920's these two southern universities together with the University of Texas began to confer the doctorate in some numbers. Duke University granted the degree in 1928, the University of Florida in 1934, Louisiana State University in 1935, the University of Georgia in 1940 (*5*). Duke conferred the doctorate in forestry in 1937.

Of the 7,337 Ph.D's granted in 1951, nine states[2] awarded 67.3 percent of the total, each awarding the degree in thirty or more fields. In that year two southern states did not award the degree, two awarded only a single degree each. Texas and North Carolina granted the degree in more than twenty fields for a total of 172 and 120 degrees respectively. The eleven southern states awarded 484 degrees, or only 6.4 percent of the national total (*1*).

[2]California, Illinois, Iowa, Massachusetts, Michigan, Minnesota, New York, Ohio, and Pennsylvania.

TABLE 1.—POPULATION, ENROLLMENT, AND EXPENDITURES FOR PUBLIC INSTITUTIONS OF HIGHER EDUCATION FOR THE ELEVEN SOUTHERN STATES EXPRESSED AS A PERCENTAGE OF THE NATIONAL TOTALS FOR THE YEARS 1930 AND 1950.[1]

Legend	1930	1950
	Percent of national totals	
Population		
Total	23.42	24.27
College age (18-21 years)	26.53	27.85
Resident enrollment in all institutions of higher education	16.65	19.96
Resident enrollment in publicly controlled institutions	19.49	24.91
Expenditures for instruction and general[2] by publicly controlled institutions	19.09	23.16

[1]Source: Council of State Governments. Items for 1950—Table E pp. 86-87; items for 1930—Tables 1, 2, 3A, 3B, and 11 in the Appendix.
[2]Adminitsration, resident instruction, separately budgeted organized research, libraries, physical plant operation and maintenance, extension.

[1]*Author's note:* I express my appreciation to the deans, directors, and heads of southern schools, who supplied detailed information on their programs.

Forestry Instruction

Forestry instruction started in the South with the opening of the Biltmore Forest School in 1898 by Dr. Carl A. Schenck at a time when schools were first being established in other parts of the country. The course of one year was continued under Dr. Schenck's direction until 1913. In 1905, George Foster Peabody proposed to endow a School of Forestry at the University of Georgia, offering annually, for three years, $2,000 for the salary of the professor of forestry and $500 additional for expenses. The offer was accepted, with Alfred Akerman, then state forester of Massachusetts, elected as professor of forestry. The Department of Forestry was officially inaugurated in November, 1906. For many years student registration was small, and graduates few in number (*3*). However, by 1935, the program had strengthened to the degree that the unit was reorganized as the George Foster Peabody School of Forestry.

Louisiana State University offered a three-year curriculum in forestry in 1924, adding a fourth year in 1925. J. G. Lee, Sr., a horticulturist, is usually credited with starting the program. He was assisted by Claude W. Edgerton, head of the Botany Department, who taught wood technology and forest pathology and State Forester Victor J. Sonderegger, who taught courses at summer camp for a number of years. Gordon D. Marckworth joined the faculty in 1925, Ralph W. Hayes in 1926.

Dr. J. V. Hofmann established a forestry department at North Carolina State College in 1929, coming from the Pennsylvania State Forest School at Mont Alto. Due to reorganization of forestry instruction in Pennsylvania, students from the Mont Alto school transferred to North Carolina State with the result that instruction was offered to all four classes during the first year of the school's existence. A class of seniors was graduated at the close of the first spring term. Ralph W. Hayes was professor of forestry for several years before returning to Louisiana State University as head of the Department of Forestry. Harold S. Newins came to the University of Florida in 1935 as professor of forestry. Two years later the School of Forestry in the College of Agriculture was organized. Edwin A. Zeigler joined the staff as professor of forestry in 1937. North Carolina State College and Louisiana State University were accredited by the Society in 1937. Florida received accreditation in 1943, Georgia in 1946.

After serving for several years as advisor to Duke University on the establishment of a forestry program for the University's forest properties, Dr. C. F. Korstian was appointed in 1931 to carry out the recommendations that were made. Under his guidance, instruction in forestry was started at Trinity College in 1932. An expanded program leading to the M.S. and Ph.D. degrees was organized in the Graduate School of Arts and Sciences in 1934. The present School of Forestry was authorized by the Trustees of the University in 1938. Accredited in 1939, the school offers the Master of Forestry and Doctor of Forestry degrees, together with the degree work carried on with the Graduate School.

Following World War II, as demands for educational facilities increased, Lloyd P. Blackwell organized the Department of Forestry at Louisiana Polytechnic Institute in 1946. In that year Dr. R. H. Westveld was appointed to head the forestry program at Alabama Polytechnic Institute, where L. M. Ware, head of the Department of Horticulture, had for many years taken an active interest in forestry and worked toward the institution of a curriculum. The Department of Forestry was organized in 1947. Through the years Professor Ware has remained its mentor and staunch supporter. Dr. Westveld went to the University of Missouri in 1947 to establish the Department of Forestry. Missouri and Auburn were accredited in 1950 and 1951, respectively. Louisiana Polytechnic Institute received accreditation in 1954.

In addition to the seven schools now accredited there are seven institutions offering four-year programs in forestry that at this time have not received accreditation. Of these, the oldest in point of service is the University of the South at Suwannee, Tennessee, where a chair in forestry was endowed in 1923. Virginia Polytechnic Institute organized its present section in forestry in 1945, but courses were offered as early as 1938. A department of forestry was started in 1945 at Arkansas A & M College. A year later, 1946, a department was set up at Oklahoma A & M College. Steven F. Austin State College, Nacogdoches, Texas, organized a department in 1947. Mississippi State College established a department of forestry in 1937; however, instruction was on a two-year preforestry level, or a four-year "Agricultural Forestry" level until 1954 when four-year forestry instruction was initiated. In 1954, McNeese State College in Louisiana also instituted a four-year curriculum.

The accredited schools with few exceptions enjoy the modern facilities and conveniences provided by buildings constructed since 1938 or since World War II. The sizes of the teaching staffs and the training and competence of these staffs are noteworthy. In the majority of the schools, half of the faculty, or more, hold the doctorate degree. Many of these men have risen to national prominence for their scholarly work and professional activity.

Instructional Program

The schools providing undergraduate instruction limited themselves to the single curriculum in forest management until 1946. In the years since then considerable diversification has been instituted. At the present time a curriculum in wildlife is offered at Louisiana State University, Florida, and Georgia. Curricula in products technology, under various titles, are offered at Auburn, Florida, Louisiana State University, and

North Carolina State College. Missouri and North Carolina State each have a curriculum in products merchandising. North Carolina State College has an undergraduate program in pulp and paper technology that has drawn much attention since its organization in 1952. For information on enrollments the reader is referred to articles appearing annually in the JOURNAL OF FORESTRY on "Statistics from Schools of Forestry," prepared by Gordon D. Marckworth since 1951 and by Cedric H. Guise in prior years.

The graduate program of the School of Forestry at Duke was reviewed earlier. The other accredited schools all have masters degree programs except Louisiana Polytechnic Institute. North Carolina State College has offered work leading to the Ph.D. degree since 1953. Doctorate programs in Forest Genetics are offered cooperatively by the Texas Forest Service and Texas A & M College, and at Florida by the School of Forestry and the Department of Agronomy. Georgia offers the degree in forestry phases of the plant sciences.

Extension

Extension activity of some type has become a part of every accredited school's program. For the past five years Louisiana State University has held an annual symposium on a pertinent subject related to problems of the day. Interest in these meetings has been growing; so much so, that the 1956 symposium on the title "Forest Management in Plan and Practice" drew to the Louisiana State University campus an attendance of about 300 from throughout the region. Louisiana State University embarked on a new venture in the fall of 1955 by offering at Bogalusa an off-campus graduate course in silviculture. This was attended by 19 foresters.

Florida has offered short courses since 1952 on such subjects as: interpretation and use of continuous forest inventory data, variable plot cruising, forest genetics, and forest site identification. Attendance has been widespread; one course had participants from twelve states, and several courses have been repeated. The program, carried on cooperatively by the School of Forestry and the General Extension Division, has been very successful.

North Carolina State College held short courses in lumber grading in 1946 and 1947. In 1949, it gave the first course in aerial photo interpretation in the South. The course had to be repeated in successive weeks because of the demand for such instruction. At present an average of about six courses, primarily in the products field, are offered annually in cooperation with the wood using industries of the state.

Short courses on operation of small sawmills, lumber grading, concentration yard operation, to name a few, offered by Auburn, have been very well received. The University of Georgia has had highly successful results with short courses on various subjects including forest management. Louisiana Polytechnic Institute holds an average of one conference or short course annually on some pertinent phase of forestry.

The University of Missouri, in cooperation with the Southwestern Lumbermen's Association, held a Retail Lumber Training Institute in 1956 with an attendance of 34 from seven states. The Institute was so successful that it probably will become an annual affair. Missouri holds other short courses as demand indicates.

Duke University, occasionally during the summer, has offered courses of one or more week's duration in the fields of forest soils and forest entomology. Conferences on industrial forest management and forest research have received much attention.

Organized Research

Organized research has a prominent and growing role in the schools of the region. At some it is within the agricultural experiment station; at others it is carried on separately by the forestry unit. All programs are rather diversified. Staff members may have joint research-teaching appointments or may be full time in research.

Under the direction of Professor L. M. Ware, some of the oldest pine plantations in the entire region were set out at Auburn in 1927-1933. In recent years Auburn has made noteworthy progress in plantation studies, nursery management, and wood technology.

Duke's research program started in 1931 as an integral part of the school's total program and has produced many notable studies familiar to foresters who remain abreast of publications in the fields of silviculture, soils, economics, entomology, mensuration, wood technology, and tree physiology.

North Carolina has become a center of forest products research and has strong programs in other areas. Florida has moved ahead in forest tree genetics with a well-rounded program in other areas.

Georgia received a grant of $100,000 from the state in 1954 to build up its research facilities. Studies are carried on cooperatively with the Southeastern Forest Experiment Station at the Georgia Forestry Center, Macon, and on the campus at Athens. The Georgia Forestry Commission cooperates financially. Organized research has been carried on at Missouri since 1936 and for ten or more years at Louisiana State University and Louisiana Polytechnic Institute.

Among the nonaccredited schools, Mississippi State College has been active in research since 1945, and Oklahoma since 1946. Steven F. Austin College initiated research in 1955.

A Regional Program

The Southern Governor's Conference of October, 1947, authorized a study of problems related to higher education. This study led to the signing of the Southern Regional Education Compact in February 1948, by the governors of 14 states. Out of the Compact grew the Southern Regional Education Board, which in June 1949, authorized exploratory studies in

FIG. 1.—Regional Committee on Forestry Education and Research. Standing, left to right: C. F. Korstian, Duke University; W. J. McGlothlin, Southern Regional Education Board; R. J. Preston, North Carolina State College. Seated: the late D. J. Weddell, University of Georgia; P. Y. Burns, Louisiana State University; W. L. Godwin, Southern Regional Education Board; Wilbur DeVall, Alabama Polytechnic Institute; C. M. Kaufman, University of Florida; L. P. Blackwell, Louisiana Polytechnic Institute.

several fields of higher education including forestry.

The Commission on Forestry and Related Training, appointed to study the problem, met in the fall of 1949. In June 1950, it reported on employment for foresters with comments on possible trends and training needs, and made recommendations for improvement of the programs being offered. The Commission recommended specifically that the colleges and universities having accredited schools of forestry located in the regional compact states enter into a memorandum of agreement by which periodic consultation on needs and progress in forestry training and research could be carried out. Such a memorandum was entered into by Auburn, Duke, Florida, Georgia, Louisiana State University, Louisiana Polytechnic Institute, and North Carolina State College. The executives of these schools now work with the Board as the Regional Committee on Forestry Education and Research (Fig. 1).

The Regional Committee has been concerned with both undergraduate and graduate programs. It has studied means of increasing inadequate student registration and ways of strengthening the quality of the instructional programs.

To this end it developed a uniform two-year preforestry curriculum (*6*). A student who has completed the curriculum with an average grade of a C+ at a college or a university accredited by the regional accrediting association may transfer to any of the undergraduate schools participating in the memorandum with the expectation of completing the requirements for the bachelors degree in two years and one summer. In Florida the pre-forestry curriculum basically as outlined by the committee has received ready acceptance by junior colleges and liberal arts colleges.

A further step towards increasing student registration was the preparation of a promotional brochure which has been widely circulated throughout the South by the Regional Board and by schools of forestry, state forestry agencies, and private companies (*7*).

Although the Committee has given primary attention to problems related to instruction, it is giving constantly increasing study to research as carried on by the schools. Particular thought is given to possible areas of cooperation and to the development of problems of a regional nature most adequately undertaken by two or more schools.

The Council of Forestry Research and Eduction in the Southern States

In order to draw the efforts of industry and governmental agencies closer to the problems of forestry education, the Southern Regional Education Board called a conference on Regional Program in Forestry Education and Research in the fall of 1952. A recommendation arising from the conference was that a regional council be established to coordinate the interests and abilities of education, industry, and government in efforts towards improving and furthering the interests of forestry education. Leaders in the wood using industries and in governmental agencies accepted council mem-

(Continued on page 668)

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Pine Hill
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Palatka
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Ball Ground
Nix Service Station
Blairsville
Nelson Tractor Co.
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Lane Trk. & Tractor Co.
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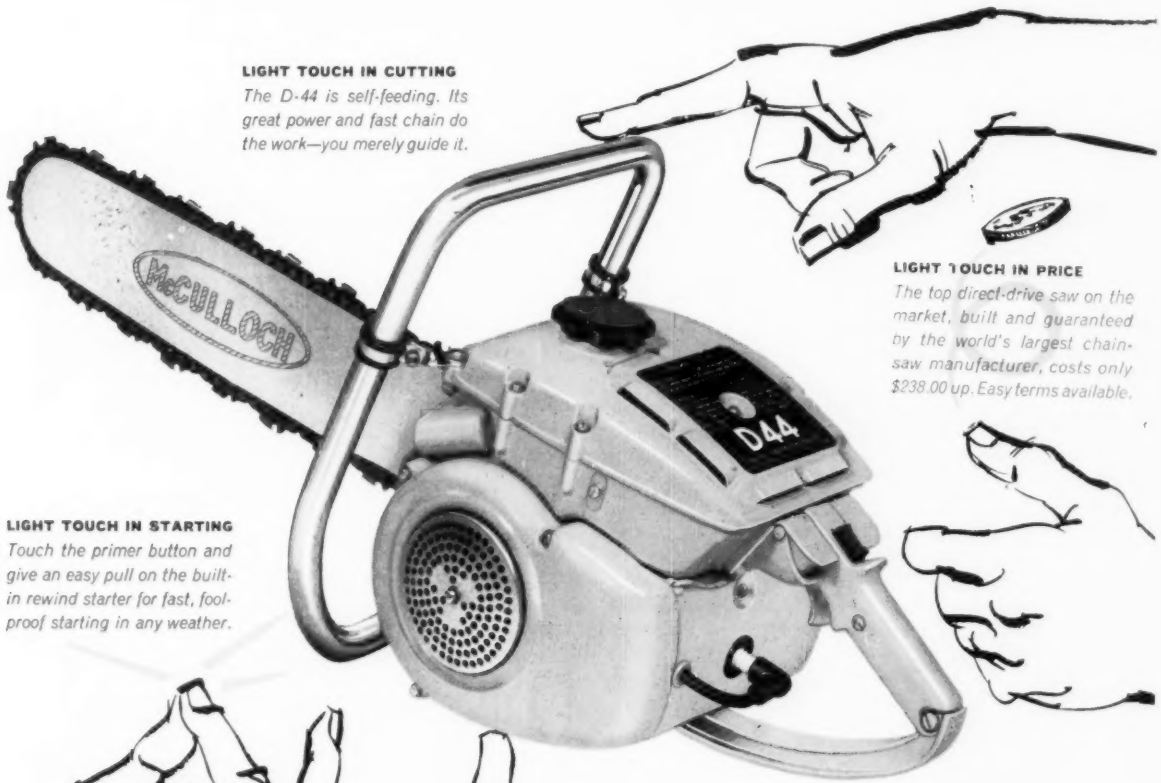

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bership and met in the spring of 1954. Mr. E. J. Gaynor, president, Brunswick Pulp and Paper Company, was elected chairman. Charles A. Connaughton, regional forester, vice-president, and Dr. W. J. McGlothlin of the Regional Board, secretary.

The Council defined its controlling purpose to be to discover, recommend, and work toward establishing more effective ways by which the various groups represented could coordinate their interests and abilities in forestry education and research to meet the needs of the region. Two initial tasks were outlined: (1) To secure support for regional forestry scholarships and (2) to determine the nature and scope of the major research activities of schools, industry, and governmental agencies.

During the fall of 1954, Messrs. Gaynor and Connaughton and Dr. McGlothlin met with selected industrial representatives in Alexandria, Louisiana, and Mobile, Alabama. At both of these meetings regional fellowships were favorably considered as a means of increasing registration of well-qualified students. Industrial representatives acknowledged a substantial need for foresters with graduate degrees but questioned whether a shortage existed of foresters with the bachelor's degree. In view of the constant requests being directed at industry to support research studies, particular interest was expressed over the possibilities of coordinating research efforts.

Although at the present time no concrete action has resulted from these activities a very pronounced change in the availability of foresters has awakened new interest in the possibility of stimulating an increased number of students to prepare for the profession. A schedule of scholarships has been prepared and further efforts toward developing an active program are being made.

Pulp and Paper Technology

Pulp and paper also operates under a memorandum of agreement within the Regional Board. Under terms of the agreement the School of Forestry at North Carolina State College concentrates on undergraduate training and the College of Engineering, University of Florida, on graduate training. Other signatories to the memorandum of agreement are the University of Arkansas and Alabama Polytechnic Institute. A course in pulp and paper technology has been established at the University of Alabama. An invitation to become a part of the regional agreement is being extended to that institution.

The signing of the memorandum is tangible evidence of intent to cooperate rather than compete in the provision of instructional services for a relatively limited outlet. The action has brought willing support by industrialists to North Carolina State's Pulp and Paper Technology program. The Pulp and Paper Foundation of the Col-

(Continued on page 671)

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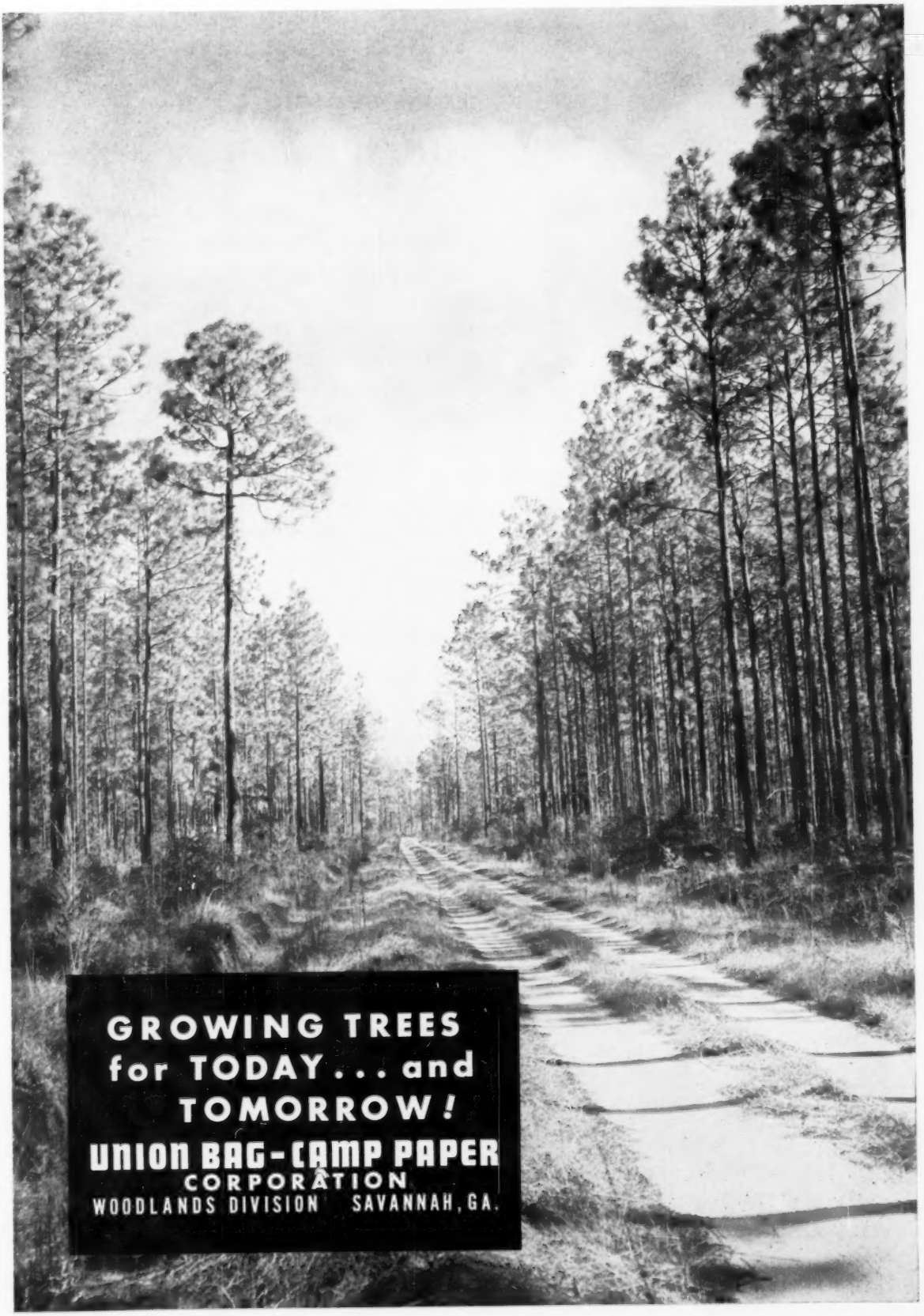
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He is the Forest Fire Warden. We salute him for his dedicated service.

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lege now has a membership of 20 mills and 35 other agencies which contribute to the budget for the pulp and paper program carried on by the School of Forestry. Construction was recently completed on a $250,000 pulp and paper laboratory.

Duke's Cooperative Plan of Study

The Duke School of Forestry since 1948 has had an understanding with Trinity College of the University whereby a student with three years of suitable arts and science preparation could enter the School of Forestry. At the completion of an additional two years and one summer of study, a student could earn the Bachelor of Science degree from Trinity College and the Master of Forestry in the School of Forestry. Beginning in 1952, this basic plan of cooperation was entered into with some 59 colleges and universities throughout the South and the nation.

Informal arrangements with these schools are concerned with a basic curriculum and the understanding that the work given at Duke will complete the bachelor's degree requirements of the respective schools, and that the work of the first three years will serve as a basis for the study of forestry.

The plan expands the area of contact with possible forestry students, providing them the opportunity of completing over half of their formal schooling to the master's degree at a school near their home. It also puts basic emphasis on supporting sciences and humanities, thus equipping the student to more readily master the theory and science of forestry in the two final years.

Texas A & M

A & M College of Texas, rather than start a college of forestry, provides two years of training that permits a student to transfer to one of the accredited schools in the South and complete the degree requirements in the normal two-year junior-senior period. Students receive funds provided by the Texas legislature for out-of-state tuition and one round-trip fare each year to the chosen school of forestry. This action by Texas A & M carries out the basic regional concept of mutual assistance. However, experience in Mississippi has shown that a significant number of young men who would study forestry if it were offered in Mississippi will not go elsewhere in order to prepare themselves for the profession.

Accreditation

Instructional strength and quality is a basic problem. As the Society of American Foresters continues to raise its standards of accreditation, a wider and wider margin of improvement is established for nonaccredited schools.

In 1953 the Regional Committee on Forestry Education and Re-

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search, aware of the very weak educational position of two- and three-instructor departments, pointed out through the facilities of the Regional Board, that the accredited schools of forestry were serving only about half of the number of students they could serve. For that reason, the Committee took the position that additional schools were not needed in the South. In the fall of 1955 this position was reconsidered. At the Committee's request the Director of the Southern Regional Education Board sent the 1953 resolution of the Committee with an appropriate cover letter to educational institutions and legislatures in the compact states.

The responsibility for the continued strengthening of southern forestry schools, accredited and nonaccredited, lies with the institutions and states of which they are a part. This responsibility is equally clear wherever new units of forestry instruction may be formed. The increasing importance of the South's forest lands and wood-using industry requires that her young men be trained in full measure for whatever phase of professional activity they undertake. The Society of American Foresters will support these efforts by providing clear equitable standards of evaluation, in every way continuing to cooperate with accrediting associations and with institutions for the constant betterment of programs and concepts.

The economic health of the South is improving rapidly, with the wood-using industry setting the pace for industrialization with giant strides. In this atmosphere of regional development, education on all levels has made outstanding advances. Even though in some phases of education the South may still lag behind more advanced areas of the nation, she is rapidly filling in her educational deficits, lifting herself into a position of strength and prominence. Professional forestry education has gained much from the growing emphasis on education, with forestry schools becoming recognized as centers of learning that are contributing in full measure to the forestry needs of the region.

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Forest Service,
U. S. Department of Agriculture

FOREST RESEARCH in the South was initiated by a small group of botanists, geologists, chemists, and itinerant foresters—pioneers such as Charles Mohr, W. W. Ashe, Samuel T. Dana, Charles S. Herty, Austin Cary, Eloise Gerry, J. S. Holmes, Wilbur R. Mattoon, I. F. Eldredge, E. H. Frothingham, and H. H. Chapman. Late in the 19th and early in the 20th century they studied the location and composition of southern forests and hypothesized on what was happening to them as a result of the hit-or-miss forest practices of the time. Although a number of decades have passed since these men started their work in the South, many of the conclusions and opinions they arrived at in those early times still appear sound today.

Organized research with slide rules and permanent field plots began in 1921, when the Southern Forest Experiment Station was established at New Orleans, Louisiana, and the Appalachian (now Southeastern) Station was set up in Asheville, North Carolina. During the following two decades, research was conducted chiefly by foresters working out of these two bases of operations, and by a few scientists in the forestry and agricultural schools. The southern phase of the nationwide Forest Survey was started, and intensive silvicultural and other studies were initiated at a few locations—Crossett, Arkansas; Bogalusa and Urania, Louisiana; Holly Springs and McNeill, Mississippi; Athens, Georgia; Auburn, Alabama; Starke and Lake City, Florida; and Asheville, Coweeta, and Durham, North Carolina.

About 1945, the Forest Farmers Association Cooperative, then of Valdosta, Georgia, spearheaded a drive for a more adequate program of federal forest research to meet the increasing demands of forestry interests in the South. This move resulted in the setting up of about twenty research centers covering most of the subregions of the South. With the aid of local advisory committees and the cooperation of local groups interested in forestry, these research centers have been a major force in the technical advancement of southern forestry in recent years. They have made notable progress in determining how best to manage the

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major southern pine and hardwood forest types.

During the last few years, the effects of inflation on the research centers have been relieved here and there by substantial cooperative assistance from the states and private industry. This cooperative pattern has stimulated the whole research program and has helped to improve coordination among forestry groups.

The increased participation in forest research by state, educational, and private agencies in recent years amounts to a trend of major proportions. For example, the nonfederal expenditures for forest management research in the south increased 55 percent from 1949 to 1952, while federal expenditures remained unchanged. Between 1953 and 1956, however, the federal forest research expenditures in the South have increased about 75 percent.

In addition to the established forest experiment stations and research centers, forestry or related research is now under way at such southern institutions as Texas A. and M. College, the Texas Forest Service, Stephen F. Austin State College, Oklahoma A. and M. College, University of Arkansas, Arkansas A. and M. College, Louisiana State University, Louisiana Polytechnic Institute, A. J. Hodges Industries, Gaylord Container Corp., Mississippi State College, Mississippi Forestry Commission, International Paper Co., Alabama Polytechnic Institute, University of the South, University of Tennessee, Tennessee Valley Authority, University of Georgia, University of Florida, Clemson College, North Carolina State College, Duke University, Virginia Polytechnic Institute, West Virginia Pulp and Paper Co., and Union Bag and Paper Corp. Many other agencies, industries, and individuals are contributing funds and facilities that greatly increase the productivity and efficiency of the research both at the federal experiment stations and elsewhere.

This diversification of the research job and sharing in its cost is a healthy trend. It means that many people participate in determining and carrying through the most important research problems. Such participation in turn has led to broader interest in research needs and programs and a prompter application of the results. Research men themselves are stimulated by the realization that the results of their work are of immediate value and use.

Application of Research Results

Some results of forest research in the South that are already being applied with increasing profit might well be mentioned.

Forest management research has developed nursery and tree-planting practices that now find routine application in the South's half-million acre annual planting program and add immeasurably to the success of this work. Nine years of research in direct-seeding of longleaf pine is paying off at the

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Alexandria, Louisiana, Center, thanks to the recent discovery of an effective bird repellent for coating the seed and to earlier studies that determined the optimum time for sowing and best methods of seedbed preparation.

Timber stand improvement techniques devised by research are increasing the volume and value of forest growth, and giving some owners a five-fold return over costs.

Developments in thinning and harvesting methods have resulted in greater yields of higher quality products. Success of such research at Crossett has stimulated research and better forest management throughout the South and even far beyond the South.

Progress made by private and public groups in southern tree improvement research in the last few years makes an impressive story. A decade ago the only active forest genetics projects in the South were those of the Tennessee Valley Authority at Norris, Tennessee, and those of the Southern Forest Experiment Station at Lake City, Florida, and Bogalusa, Louisiana. Since then, new forest genetics projects have been started by various agencies and private interests in Texas, Arkansas, Louisiana, Mississippi, Georgia, Florida, Alabama, and North Carolina. Some of this research work is already paying off.

The existence of geographic strains of loblolly pine has been demonstrated by the Southern Forest Experiment Station's well-known test at Bogalusa, Louisiana. On comparable sites, the best strain out-yielded the poorest by four to one in this experiment, which emphasizes the values to be gained or lost depending on the suitability of the seed selected for planting. The Lake City Center of the Southeastern Forest Experiment Station has shown that gum resin yield is an inherited trait of longleaf and slash pine. The anatomical and physiological features accounting for much of the variation in gum yield from tree to tree have been discovered, and successful grafting and air-layering techniques have been developed to propagate the best characteristics.

The Texas Forest Service has made selections of southern pines with extremes in wood density, and is trying to determine the extent to which wood density is inherited. Selected strains of loblolly from the islands of "lost pines" of the Texas plains give promise of being able to survive extreme drought.

Established in 1954, the Southern Institute of Forest Genetics at Gulfport, Mississippi, is investigating the fundamental principles of forest tree inheritance in addition to doing applied research in tree selection and breeding for the surrounding territory. It also serves as a demonstration area, and a source of valuable plant material and information on forest genetics applicable to the entire South.

Genetics research in the South is coordinated by the Southern Forest Tree Improvement Committee, representing private, state

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and federal forestry groups. The guidebooks and sample plans prepared by this Committee have stimulated several new groups to start tree improvement studies. A major activity of this Committee has been the planning and sponsorship of a region-wide study of the geographic races of southern pines —probably the largest pine seed-source study ever undertaken anywhere. Twenty-five cooperators collected 47 lots of seed of loblolly, shortleaf, longleaf, and slash pines in 15 different states. Over 200,000 seedlings were grown in 19 different nurseries, and have been planted out in more than 60 test plantations from Maryland to Texas. Only close cooperation of many groups could make such a comprehensive experiment possible. Preliminary returns from the third-year examination indicate striking racial differences in survival, growth rate, and resistance to disease.

Fire research technicians have devised fire danger meters that aid greatly in predicting bad fire weather and thus improve the efficiency of fire-fighting forces. They have also developed methods of prescribed burning in pine forests to control unwanted vegetation, prepare seedbeds for regeneration, and reduce heavy fuel hazards. From extensive studies of fire effects, damage appraisal tables have been standardized. Fundamental research on fire behavior has greatly contributed to knowledge of the basic causes of blow-up fires.

Forest products research has effectively stimulated expansion of the timber industries in the South. The Forest Products Laboratory at Madison, Wisconsin, devotes about one-third of its regular activities to southern problems. For example, the semi-chemical and cold soda processes of pulping developed at that Laboratory produce very high yields from hardwoods. Over 20 southern mills now use the semi-chemical process in the production of more than a million tons of pulp per year. Federal research in laminating techniques is responsible for much of the expansion in the laminating and plywood industry.

Improvements in the seasoning and preservation of wood have maintained and expanded important markets for wood products. For example, between 1949 and 1954 cooperative research and demonstrations sponsored by the Coordinated Wood Preservation Council virtually doubled the use of pressure-treated southern pine posts. Research in log grades has provided a systematic means of estimating the lumber quality derivable from various log classes and has aided in making accurate appraisals of timber values. Early cooperative research by the Southern Forest Experiment Station and International Paper Co. provided the foundation for the present growth in the use of sawmill residues as a source of pulping material. These and many other technological advances have been developed by research and promoted

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by the Forest Utilization Service men at the federal experiment stations in the South.

Watershed studies at Coweeta, North Carolina; Union, South Carolina; and Oxford, Mississippi, are showing how forests influence water yields; how land-use practices affect runoff of water and resulting erosion; how gullied land can best be reforested; how floods and sedimentation may be reduced by forestry practices; and how to stabilize roadbanks and channels and lay out logging roads to minimize erosion. At Vicksburg, Mississippi, Forest Service scientists and the U. S. Army Corps of Engineers are cooperating in soil-moisture studies to develop methods of predicting vehicle trafficability over the major soil types of the continent.

In the field of naval stores production, research has improved methods of gum extraction through bark chipping and acid treatment of the cut that have revolutionized woods work in this oldest southern forest industry. These new techniques, which have now been adopted by most operators, have increased the productivity of labor by nearly one-half, and have improved the quality of timber obtained from the tree after it is worked out for naval stores.

Research in forest pest control, now well started in federal forest insect and disease laboratories in the South, has reduced losses from bark beetles and defoliators, from brownspot disease on longleaf pine, from littleleaf disease of shortleaf, from fusiform rust on the southern pines, and from root rots in forest tree nurseries. Research on decay prevention in wooden buildings and on termite control in the South has saved home owners countless costly repairs and has protected and strengthened important markets for wood products.

The national Forest Survey has been of outstanding importance to the South in stimulating expansion of forest industry and in guiding forestry investments. This periodic inventory of forest resources, by geographic units, with determination of growth and drain, has proved and is proving increasingly valuable in locating new

(Continued on page 687)

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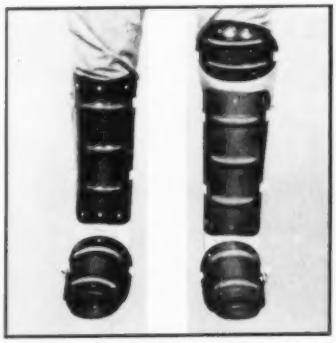

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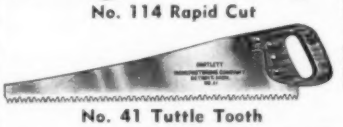

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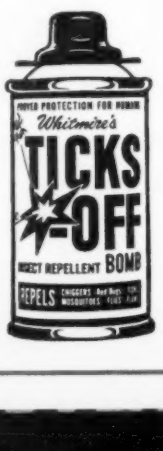

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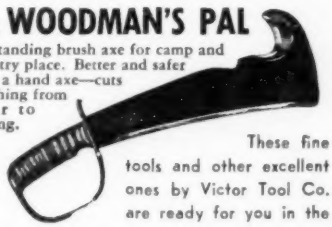

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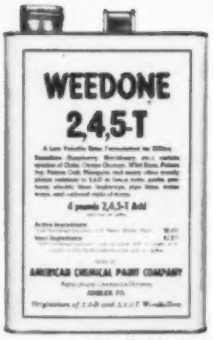

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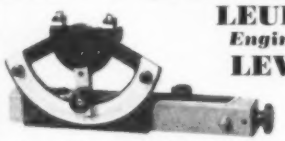

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wood-using plants, particularly pulp and paper mills. These have multiplied thirteen-fold in the South since the Forest Survey began in 1930. Techniques of point-sampling recently developed at the Southern Station promise to increase the efficiency of the Forest Survey and of the more intensive inventories needed in planning the management of southern forests in the years ahead.

Research in the development and use of southern forest ranges for livestock got under way in the late 1930's and early 1940's, and has gradually expanded through the cooperative efforts of the federal Forest Service, the Bureau of Animal Industry, Bureau of Plant Industry, and the states of North Carolina, Georgia, Florida, Louisiana, and Texas. This work has clarified relationships between timber and forage production and indicates that these two uses can be well integrated in much of the Coastal Plain forest.

Interest in wildlife has increased enormously in the South since World War II. As a result, the U. S. Fish and Wildlife Service and the several state game commissions have started research in the production and management of deer, squirrels, quail, turkeys, and other game. Much of this work is financed by Pittman-Robertson funds derived from the federal excise tax on sales of arms and ammunition. Stimulated by the increasing conflicts between timber production and game production, the Southern Forest Experiment Station in 1955 started research on wildlife habitat management in cooperation with other interested agencies. The effect of timber management practices on game habitat and game populations and of game management practices on timber production will be determined.

Outlook Is for Increased Research

Research has contributed importantly to the advance of forestry and forest industry and the general upsurge in the standard of living in the South. Although southern forest research has been strengthened significantly in recent years, it is presently operating at only about one-third of the level judged by the Society of American Foresters special Research Committee as a minimum future standard; in other words, we are only partially realizing the contributions that science and technology could make toward improved forest productivity. In fact, many fields of research have until recently received almost no attention, such as genetics, hardwood management, the techniques of rehabilitating understocked areas, and the utilization of low-quality woods.

The present trends in our regional and national population growth, in purchasing power, and in the demand for forest products are all upward. Spectacular expansion of wood-processing plants under way here shows that industry shares this confidence in the future of our forests. During the past few years, the South has ac-

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counted for 47 percent of our national timber products output, and demands on the southern forest will intensify as the western old-growth stands decline in importance. So our need for forest research applicable to the South is certain to increase.

In the first place, an increasingly dynamic forest industry needs up-to-date information about its raw material supply. The rate of change in the southern forest can be very rapid. The Forest Survey will have to step up the pace and operate on a shorter schedule than the 15- to 20-year cycle it has been constrained to follow in the past. The states, the forest industries, and timberland owners are all showing an increasing determination to do their share of the job, and the prospect is good that research in Survey techniques will increase the efficiency of the work and the detail and value of the information obtained.

Few forests respond as quickly to good management as do those in the South, and the nature of this response varies widely depending on the kind of treatment given and the conditions under which they are applied. Blanket prescriptions will not do the job as forestry becomes more intensive, and research still has a big task for the years ahead to chart out the most efficient ways to care for each situation. A large amount of research, particularly in such basic sciences as plant physiology, genetics, forest soils, and ecology, as well as in silviculture, mensuration, and forest economics, will be required.

For example, reforestation is needed on some 22 million acres in the South. The opportunities through research of maximizing the returns and minimizing the costs of such a vast undertaking are tremendous. What are the best methods of site preparation? What species, strain of species, or combination of tree composition is best suited to each of the innumerable sites involved? What methods of forest establishment and care are most efficient? Where can direct-seeding do a better or cheaper job than planting? How can special strains resistant to diseases and insects and having capacity to make rapid growth of high-quality wood best be developed?

Management of established stands is another tremendous challenge to research. For the great variety of forest sites across the South, who can say now what the most efficient level of growing stock is? What is the optimum composition and the best combination of tree sizes for a given stand? What rotation or harvesting age is most productive for each combination of variables? How best can we step up efficiency of our present stand improvement and harvest cutting practices, which often yield inconsistent and unexplained results? Southern for-

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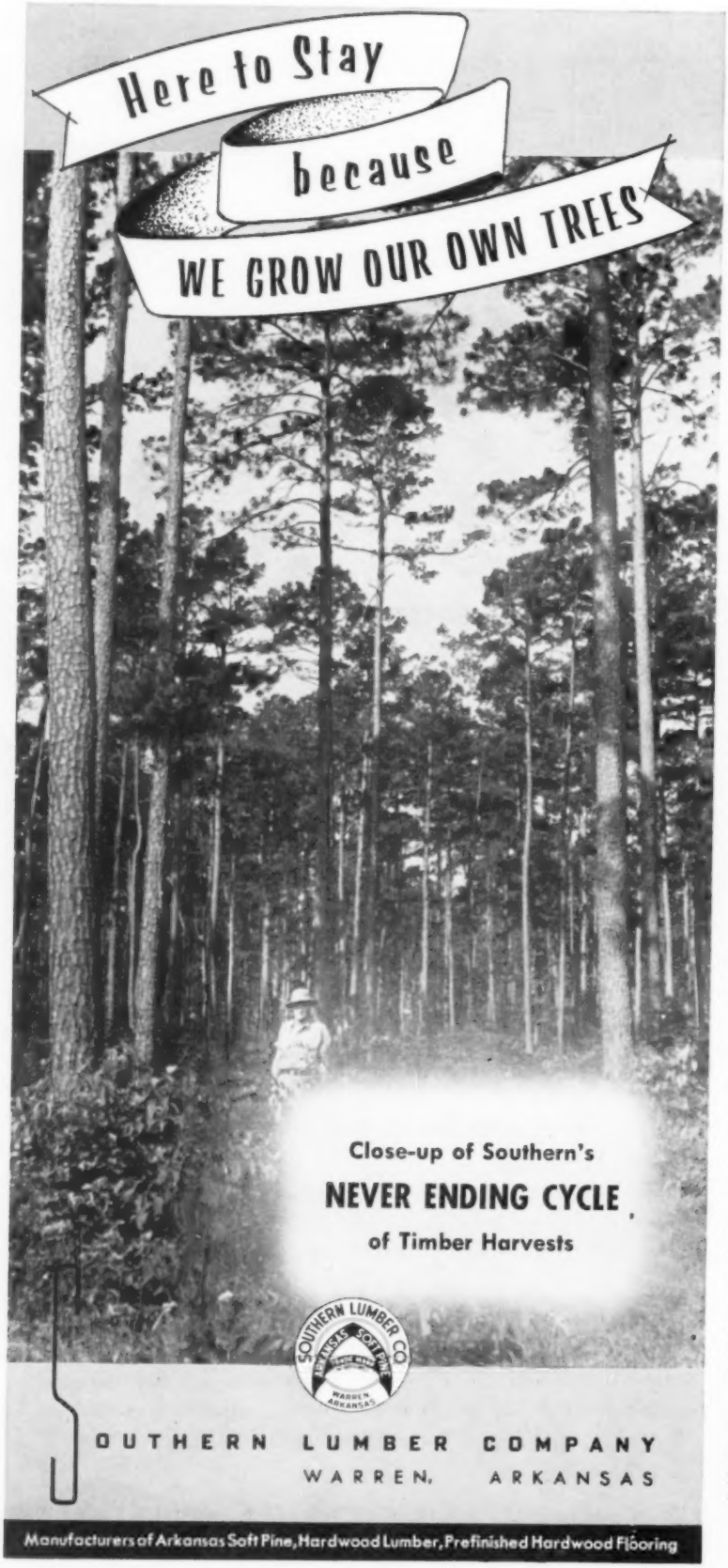


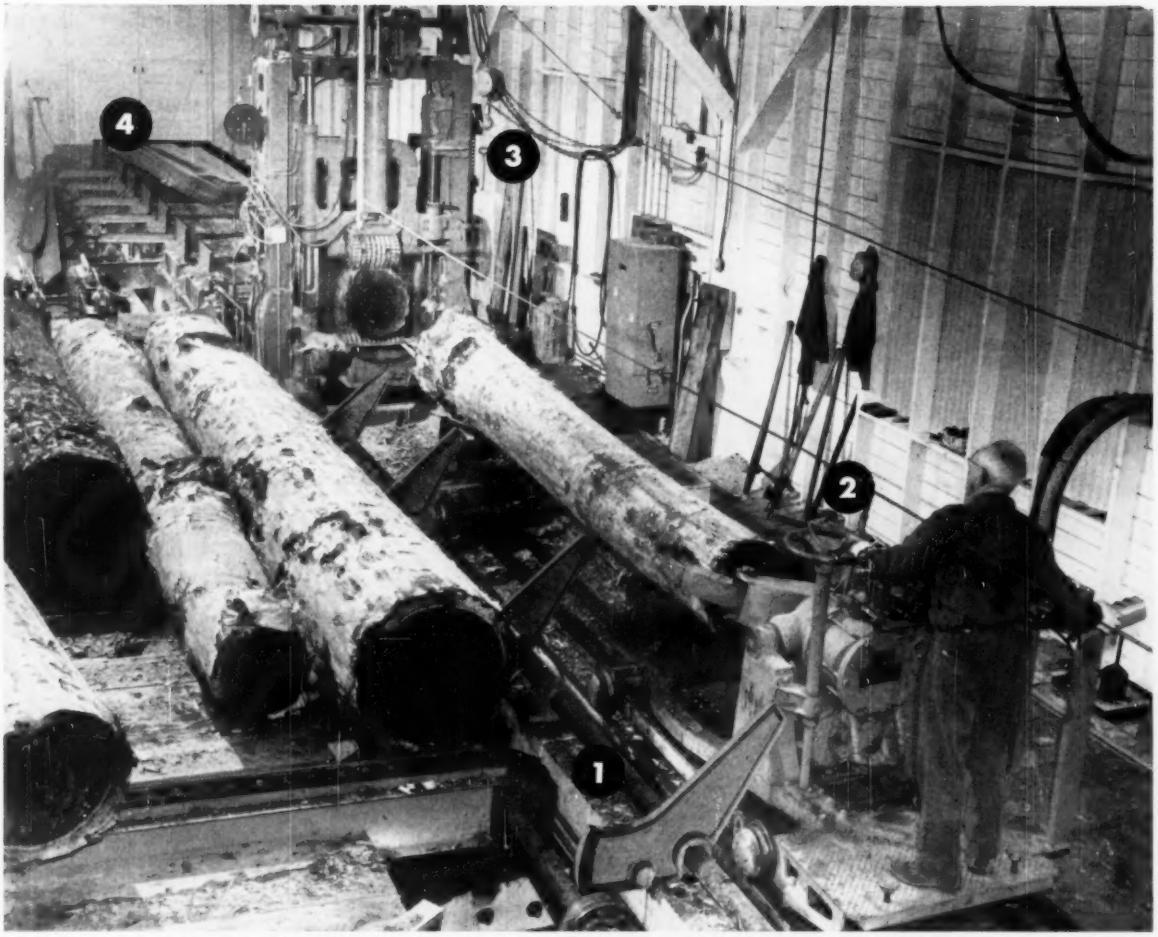
est researchers will be busy with such practical problems in the years ahead and will supply vastly better answers than we now have.

Improvements in management are already developing an increasingly valuable forest in the South. This situation multiplies the problems and also the rewards of protecting this vital resource from fire, insects, and disease. Research has a good start on these activities, but only a start, and the outlook is favorable for making important improvements in the years ahead.

Forest products research has added effectively to the timber inventory in the South. Even so, more than one-quarter of the potentially useful wood volume in the trees harvested here is not presently used. In addition, in many forests, one-third or more of the volume is in low-grade timber that under current utilization opportunities has little or no value.

Commercial outlets for such unwanted wood could stimulate profitable new industries operating on a raw material now wasted. The resulting step-up in the cutting of the poorer trees would have the added advantage of increasing the value of timber growth for future harvest by releasing the most promising trees. Forest utilization research can find solutions to these problems. For example, more efficient processes for pulping, including the pulping of species now little used, are important probabilities. Improved techniques for fabrication of particle board could stimulate greatly this promising new industry in the South. Of special importance to future generations, research must better define the relationships between wood quality and conditions of tree growth. If this is done, then management can move confidently to improve the quality of our timber yields, and present trends toward accumulation of low-grade raw material can be corrected.

The upsurge in population is multiplying the demands for the non-wood products of the southern forest, too. More Americans want to use the forest for recreation; more



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want to hunt squirrels, deer, turkeys, and other forest game. Owners of livestock want to graze their animals on southern forest ranges. Every year the use of water for domestic purposes, for industry, and for irrigation is increasing in the South, and the recent series of dry years emphasizes the need to increase the quantity as well as the quality of water yields from our forested watersheds. Persistent floods and erosion continue to call attention to the need to control better the water that falls on our forests and on the 22 million acres that should be planted to forest.

These uses conflict with each other and with timber production over increasingly larger areas. Research in watershed management, in wildlife habitat, and range management has a big task ahead before the optimum combination of uses can be prescribed with confidence for specific areas.

How can we best obtain for ourselves, for our children, and for their children the optimum combination of continuing benefits that our 200 million-acre forest heritage can supply? To provide the know-how needed to succeed in this quest is the task and the challenge of forest research in the South. The potential rewards are impressive, as is the determination of our people—forest owners, industries, research workers, and all—to do the job.

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Annual Meeting

Society of American Foresters
Memphis, Tenn., October 15-17, 1956
Theme: "Forestry Faces Forward"

Schedule of Events

Members, their ladies, and guests who plan to attend the Society's 56th annual meeting are urged to arrive in Memphis on Sunday, October 14, or not later than the morning of Monday, October 15. The opening general session starts on Monday morning.

Because of the full schedule of meetings and social activities, alumni groups are requested to plan their get-togethers during the dinner period (5 p.m. to 7:30 p.m.) on Monday evening, October 15.

Saturday, October 13

Council of Forestry School Executives: all day.

Sunday, October 14

S.A.F. Council: morning and afternoon.

Editorial Board, JOURNAL OF FORESTRY: evening.

Association of Consulting Foresters: evening.

Ladies tea (open house): late afternoon.

Monday, October 15

Opening General Session: morning.

Society Affairs Session: afternoon.

Ladies bus tour and luncheon: late morning and afternoon.

Forestry School Alumni Reunions: dinner period.

Division of Private Forestry: evening.

Division of Range Management: evening.

Division of Education: evening.

Division of Forest Recreation: evening.

Tuesday, October 16

Division of Silviculture: morning and afternoon.

Ladies Forestry Forum: morning.

Division of Watershed Management: morning.

Division of Economics and Policy: afternoon.

Division of Forest Products: afternoon.

"Beale Street Night:" evening.

Wednesday, October 17

Division of Forest Management: morning and afternoon.

Division of Public Relations: morning.

Ladies bus tour and luncheon: late morning and afternoon.

Division of Forest Wildlife Management: afternoon.

Reception and social hour: early evening.

Annual dinner: evening.

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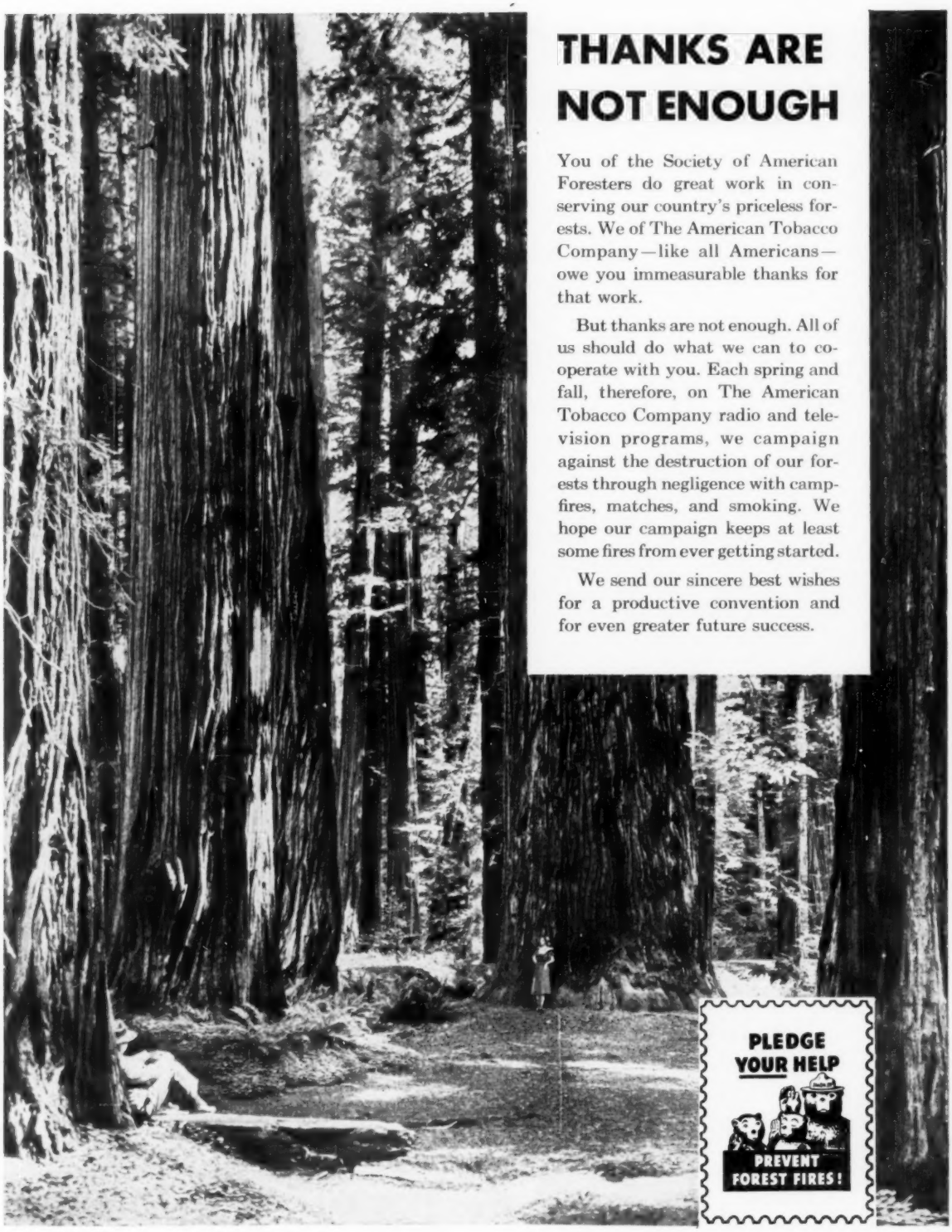

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Thursday, October 18

Field trips: all day.

Friday, October 19

Field trips: all day.

General Meeting

Monday, October 15

E. L. Demmon, Chairman

Morning Session

Theme: "Forestry Faces Forward"

1. "Making the Most of the Southern Forest: the Opportunities, the Tasks." Joseph E. McCaffrey, International Paper Company, Mobile, Ala.
2. "Special Horizons in Hardwood Forestry." S. M. Nickey, Jr., Nickey Brothers, Inc., Memphis, Tenn.
3. "Opportunities and Problems in Utilizing Wood Products of the Southern and Southcentral Forests." J. Alfred Hall, U. S. Forest Products Laboratory, Madison, Wis.

Society Affairs Session

Monday, October 15

DeWitt Nelson, President
George A. Garratt, Vice President
Henry Clepper, Executive Secretary

Afternoon Session

Report of the President, DeWitt Nelson.

Report of the Executive Secretary, Henry Clepper.

Report of the Editor of Society Publications, Arthur B. Meyer.

Report of the Editor of *Forest Science*, Stephen H. Spurr.

Report of the Special Committee on State Registration of Foresters Julius Kahn, chairman.

Report of the Special Committee on Public Relations, C. W. Mattison, chairman.

Report of the Council Committee on Membership, Henry J. Vaux, chairman.

Report of the Committee for the Advancement of Forestry Education, Harold G. Wilm, chairman.

Report of the Joint Committee on Fire Control Equipment with American Society of Mechanical Engineers, A. A. Brown, chairman.

Report of the Committee on Civil Service, Richard J. Preston, chairman.

Report of the Committee on International Relations, V. L. Harper, chairman.

Report of the Committee on History of Forestry, E. N. Munns, chairman.

Discussions by the Council and Section delegates:

1. Proposed increases in dues (now $6) for Affiliate Members and Associate Members.
2. Possible elimination of Bylaw 75 which provides for Associate Members of Sections who are not members of the Society.

Open forum discussion of Society affairs.

Division of Forest Recreation

Monday, October 15

Donald P. Duncan, Chairman
James P. Gilligan, Vice Chairman
Felix Koziol, Secretary

Evening Session

1. "Mission 66—The National Park System in 1966." Conrad L. Wirth, National Park Service, Washington, D. C.

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3. "Research into the Human Element in Wilderness Use." Marvin Taves and Gregory Stone, Department of Sociology, University of Minnesota, Minneapolis, Minn.

4. "Research Needs in Forest Recreation." Samuel T. Dana, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

5. "Legal Aspects and Owner Responsibilities in Forest Recreation." Rawleigh L. Tremain, General Counsel's Office, U. S. Department of Agriculture, Washington, D. C.

Division of Range Management

Monday, October 15

Bert H. Tucker, Chairman
Elbert H. Reid, Vice Chairman
John T. Cassady, Secretary

Evening Session

1. Panel discussion: "The Place and Function of the Division of Range Management in the Society of American Foresters."

Moderator: Lincoln Ellison, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Panel:

DeWitt Nelson, California, Department of Natural Resources, Sacramento, Calif.

Robert S. Campbell, Southern Forest Experiment Station, New Orleans, La.

Milo H. Deming, Bureau of Land Management, U. S. Department of the Interior, Salt Lake City, Utah.

2. "Supplemental Feeding of Cattle on Forest Ranges in the South." John T. Cassady, Southern Forest Experiment Station, Alexandria, La., and Lowell K. Halls, Southeastern Forest Experiment Station, Tifton, Ga.

3. "New Developments in Chemical Brush Control." Hurlon C. Ray, Soil Conservation Service, Fayetteville, Ark.

4. Business Meeting.

Division of Education

Monday, October 15

W. F. McCulloch, Chairman
David M. Smith, Vice Chairman
A. Bigler Crow, Secretary
Wilbur B. DeVall, Program Chairman

Evening Session

Theme: "Regional Planning for Forestry Education in the South"

1. "Objectives of Regional Planning: the Committee at Work." Clarence F. Korstian, School of Forestry, Duke University, Durham, N. C.

2. "Activities of a Regional Council." Winfred L. Godwin, Southern Regional Education Board, Atlanta, Georgia.

3. "Preforestry Training and Transfer within the Region." Alfred D. Folweiler, Texas Forest Service, College Station, Texas.

4. "Recruitment Efforts in the South." Clemens M. Kaufman, School of Forestry, University of Florida, Gainesville, Fla.

5. "Extending Regional Planning to Pulp and Paper Technology." Richard J. Preston, School of Forestry, North Carolina State College, Raleigh, N. C.

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Division of Private Forestry

Monday, October 15

Arthur W. Nelson, Chairman
William C. MacAdam, Vice Chairman
Sulo V. Sihvonen, Secretary

Evening Session

1. "Let's Cut One for Ourselves! The Outline of a New Idea: a Forestry Company of, by, and for Foresters." Harry Nadler, K-T Forestry Company, Inc., Pineville, Ky.

2. "The Development of Hardwood Forests on Private Lands in the South." John W. Squires, Mississippi Products, Inc., Jackson, Miss.

3. "Natural Areas and Private Forestry." John F. Shanklin, Committee on Natural Areas, Society of American Foresters, Washington, D. C.

4. "The Selection and Training of Foresters for Executive and Managerial Positions." Glenn Ball, Flintkote Co., Meridian, Miss.

Comments. George A. Garratt, School of Forestry, Yale University, New Haven, Conn.

Division of Silviculture

Tuesday, October 16

Carl Ostrom, Chairman
Henry I. Baldwin, Vice Chairman
Leon H. Chaiken, Secretary

Morning Session

Symposium on the Silviculture of Southern Hardwoods

Moderator: John W. Squires, Mississippi Products, Inc., Jackson, Miss.

1. "Opportunities and Problems in the Silviculture of Southern Hardwoods." John A. Putnam, Southern Forest Experiment Station, Stoneville, Miss.

2. "Insects and Diseases in Southern Hardwoods." Robert C. Morris and Richard E. Toole, Southern Forest Experiment Station, Stoneville, Miss.

3. "Variation in Hardwood Growth Rate Attributable to Species and Sites." Thomas C. Nelson, Southeastern Forest Experiment Station, Athens, Ga., and William R. Beaufait, Southern Forest Experiment Station, Stoneville, Miss.

4. "Improvement of Southern Hardwood Stands Through Commerical Harvest or Noncommercial Deadening." J. Scott McWilliams, Union Producing Company, Monroe, La., and J. Sidney McKnight, Southern Forest Experiment Station, Stoneville, Miss.

5. "Silvics and Silviculture of the Most Primitive Hardwoods—Cottonwood and Willow." Carl Maisenhelder, Southern Forest Experiment Station, Stoneville, Miss., and Charles Heavrin, Anderson-Tully Lumber Company, Dyersburg, Tenn.

6. "Future Improvement in Southern Hardwood Quality and Yield Through Genetics." E. G. Wiesehuegel, Tennessee Valley Authority, Knoxville, Tenn.

Afternoon Session

1. "Some Analytical Techniques for Tree Race Studies." Howard R. Kriebel, Department of Forestry, Ohio Agricultural Experiment Station, Wooster, Ohio.

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2. "Weekly Diameter Growth of Shortleaf Pine and White Oak as Related to Soil Moisture." William R. Boggess, Dixon Springs Experiment Station, University of Illinois, Robbs, Ill.

3. "Some Factors in Seedling Survival Near the West Margin of the Southern Pine Belt." Edwin R. Ferguson, Southern Forest Experiment Station, Nacogdoches, Tex.

4. "Administrative and Technical Aspects of Establishing Pine Seed Orchards." L. A. Hargreaves, Jr., Georgia Forestry Commission, Atlanta, Ga., and Keith W. Dorman, Southeastern Forest Experiment Station, Macon, Ga.

5. "Prescribed Burning in the Silviculture and Management of Southern Pine-Hardwood and Slash Pine Stands." T. H. Silker, Texas Forest Service, Kirbyville, Tex.

Division of Watershed Management

Tuesday, October 16

Robert E. Dils, Chairman
Howard W. Lull, Vice Chairman
E. A. Johnson, Secretary

Morning Session

1. "Woodlands Part and Foresters' Opportunities in Small Watershed Improvement." George R. Phillips, Soil Conservation Service, Washington, D. C.

2. "Evapo-Transpiration and Water Yields Following Forest Cutting and Natural Regrowth." Jacob Kovner, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

3. "The Chestuee Watershed Project in Lower East Tennessee." Homer A. Smith, Tennessee Valley Authority, Athens, Tenn.

4. "Watershed Management on National Forests of the South." C. Otto Lindh, U. S. Forest Service, Atlanta, Ga.

5. "What's Ahead for Watershed Management Research." V. L. Harper, U. S. Forest Service, Washington, D. C.

6. Business meeting.

Report of the Committee on Hydrologic Training Needs of Foresters. Harold G. Wilm, College of Forestry, Syracuse, N. Y.

Division of Economics and Policy

Tuesday, October 16

Albert C. Worrell, Chairman
Arthur S. Todd, Jr., Vice Chairman
Carl H. Stoltenberg, Secretary

Afternoon Session

1. "Intensive Management Can Be Profitable in the South." R. R. Reynolds, Southern Forest Experiment Station, Crossett, Ark.

2. "Planning Forest Production from the Individual Land Owner's Point of View." Solon L. Barraclough, Ames Plantation, University of Tennessee, Grand Junction, Tenn.

3. "Date Needs, Sources, and Deficiencies for Input-Output Analysis in Forestry." Thomas G. Herndon, School of Forestry, University of Florida, Gainesville, Fla.

4. "Effect of Government Programs on Timber Production in the South." Robert K. Winters, Division of Forest Economics Research, U. S. Forest Service, Washington, D. C.

5. "Some Likely Effects of Closer Utilization on the Supply of Southern Stumpage." Walter C. Anderson, Southeastern Forest Experiment Station, Asheville, N. C.

6. "Stumpage Price Reports as a Stimulus to Timber Growing." Sam Guttenberg, Southern Forest Experiment Station, New Orleans, La.

7. "Stumpage Prices as a Production Guide in Forestry." Carl H. Stoltenberg, Northeastern Forest Experiment Station, Upper Darby, Pa.

Division of Forest Products

Tuesday, October 16

Russell Stadelman, Chairman
Stephen B. Preston, Vice Chairman
Harry E. Troxell, Secretary

Afternoon Session

1. "Utilization—The Key to Better Forestry at Crossett." S. V. Sihvonen, Crossett Forestry Division, Crossett, Ark.

2. "Five-Year Trend in Circular Sawmill Operations in the Tennessee Valley." John W. Lehman, Tennessee Valley Authority, Norris, Tenn.

3. "Research on Hardwoods for

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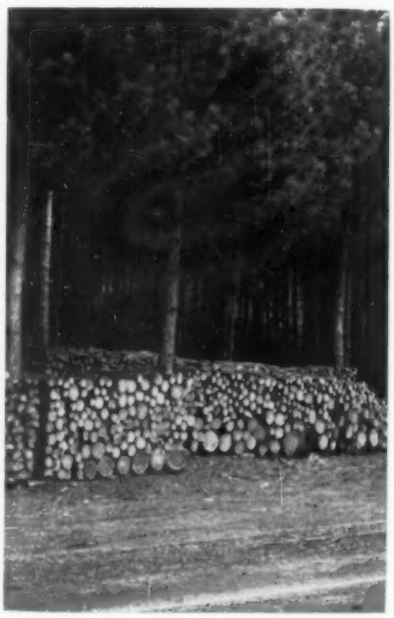

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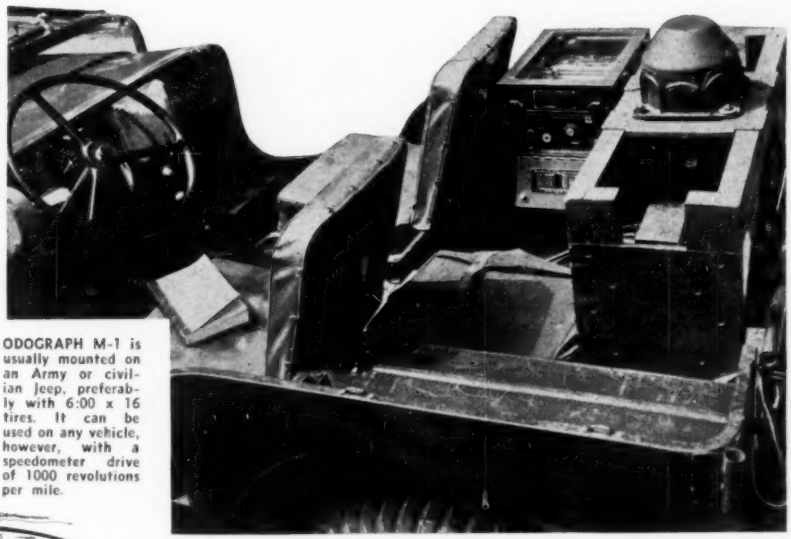

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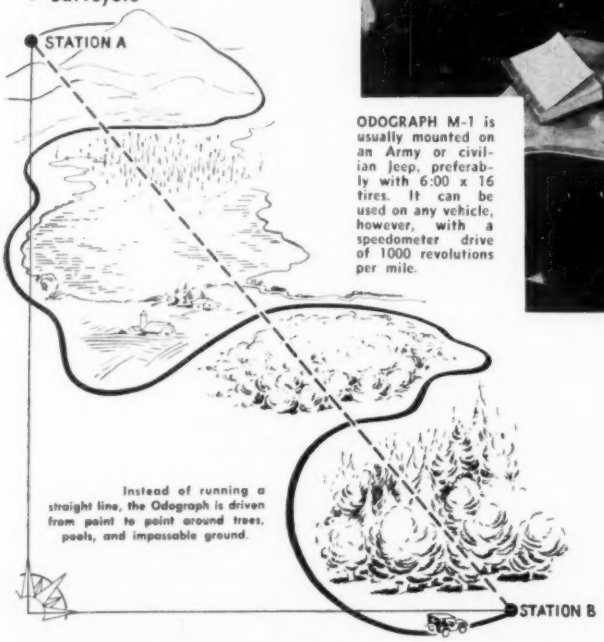

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SCALE: Any scale from 1 to 20,000 to 1 to 500,000 on the Monroe model and 1 to 20,000 to 1 to 800,000 on the IBM model may be plotted, giving a map area of from 2.40 x 3.15 miles to 60.1 x 79.40 miles on the Monroe or 2.40 x 3.18 to 96.16 x 127.04 on the IBM model.

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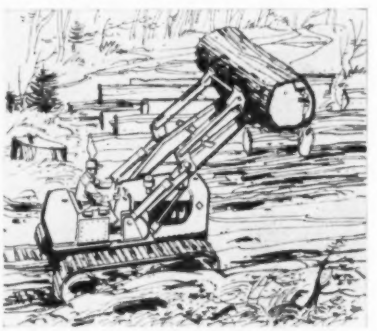

With either standard bucket or bulldozer blade, the busy HD-6G builds and maintains access roads, clears away snow from roads, yards, landings.

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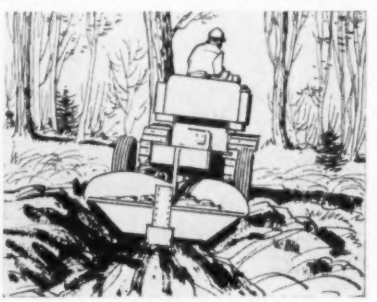

Pulp and Paper." Robert J. Seidl, Forest Products Laboratory, Madison, Wis.

4. "Flotation Logging." George C. Lucas, May Brothers, Inc., Garden City, La.

5. "New Developments in the Veneer and Plywood Industry in the South." Walton R. Smith, Southeastern Forest Experiment Station, Asheville, N. C.

Comments. James S. Bethel, North Carolina State College, Raleigh, N. C.

Division of Forest Management

Wednesday, October 17

J. Walter Myers, Chairman
Gerald S. Wheeler, Vice Chairman
B. E. Allen, Secretary

Morning Session

1. "Continuous Forest Inventory as a Guide to Management." George W. Abel, St. Regis Paper Company, Jacksonville, Fla.
Discussion.

2. "Inventory Analysis—First Aid to Hardwood Management." Charles L. Tebbe, U. S. Forest Service, Upper Darby, Pa.
Discussion.

3. "The Consulting Forester's Role in Developing Better Management on Small Tracts." Charles R. Page, Jr., Consulting Forester, Chattanooga, Tenn.
Discussion.

4. "Managing Forests under a Tree Farm Family Program." Richard C. Allen, A. DeWeese Lumber Company, Inc., Philadelphia, Miss.
Discussion.

5. "The Place of Hardwoods in Forest Management for Pulpwood." John W. Johnson, Union Bag & Paper Corporation, Savannah, Ga.
Discussion.

Afternoon Session

1. "Relation of Forest Management to the Insect Problems in the South." R. Joseph Kowal, Southeastern Forest Experiment Station, Asheville, N. C.
Discussion.

2. "The Place of Prescribed Burning in Protecting the Forest." William M. Oettmeier, Superior Pine Products Company, Fargo, Ga.
Discussion.

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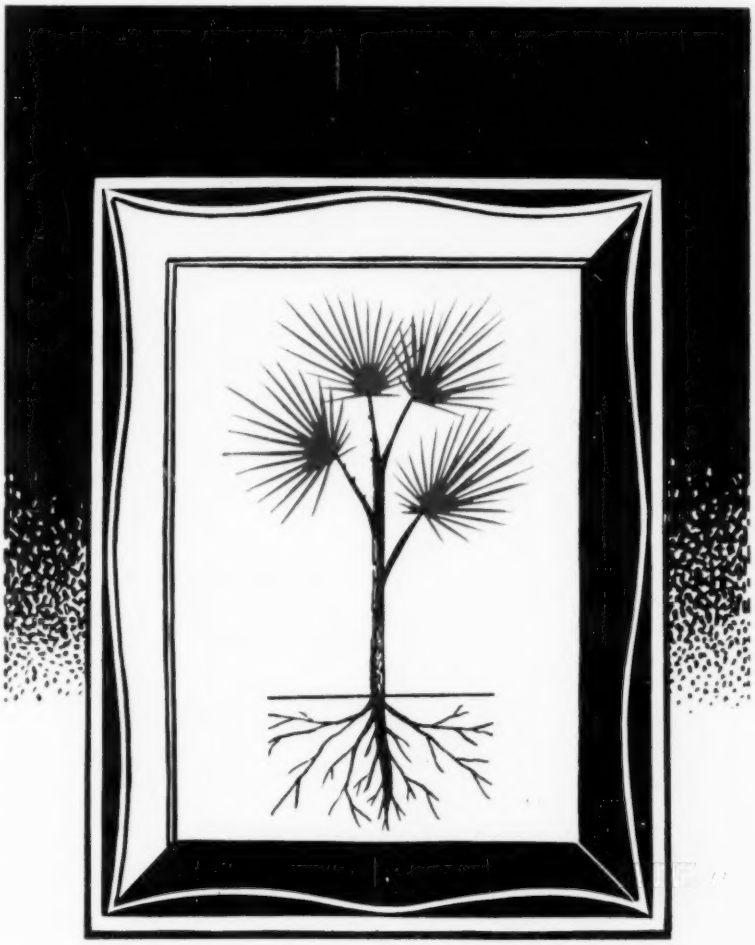

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3. "Forest Fire Insurance as it Affects Forest Management and Fire Control Activities." Monroe F. Greene, Seibels, Bruce & Company, Columbia, S. C.

Discussion.

4. "Forest Fire Research—What it Can Offer Forest Management." V. L. Harper, U. S. Forest Service, Washington, D. C.

Discussion.

5. "Summing Up the Presentations of the Division of Forest Management." John W. Squires, Mississippi Products, Inc., Jackson, Miss.

6. Business session.

Division of Public Relations

Wednesday, October 17

Charles W. Mattison, Chairman
Fred E. Winch, Jr., Vice Chairman
J. Walter Myers, Jr., Secretary

Morning Session

Panel Discussion: The Small Forest Landowner—Keystone and Enigma In Forestry. A discussion of how best to reach this owner through education.

Moderator: Richard J. Preston, School of Forestry, North Carolina State College, Raleigh, N. C.

Panel:

C. Huxley Coulter, Florida Forest Service, Tallahassee, Fla.

Henry J. Malsberger, Southern Pulpwood Conservation Association, Atlanta, Ga.

Herman E. Baggenstoss, *Grundy County Herald*, Tracy City, Tenn.

James W. Craig, Forestry Suppliers, Inc., Jackson, Miss.

Division of Forest-Wildlife Management

Wednesday, October 17

Ralph T. King, Chairman
Avon Denham, Vice Chairman
C. Frank Brockman, Secretary
Howard A. Miller, Program Chairman

Afternoon Session

1. "Coordinated Forestry, Farm and Wildlife Programs for Family Sized Farms of the Coastal Plain of the Deep Southeast." Herbert Stoddard, Sr., Sherwood Plantation, Thomasville, Ga.

Comments. Frank Heyward, Gaylord Container Corporation, Bogalusa, La.

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2. "Game as a Product of Intensively Managed Forests." Hubert D. Burke and Robert M. Blair, Southern Forest Experiment Station, New Orleans, La.

Comments. N. W. Sentell, Southern Advance Bag and Paper Division of Robert Gair Company, Hodge, La.

3. "Importance of Southern Bottomland Hardwoods in Wildlife Management." Bryant A. Bateman, School of Forestry, Louisiana State University, Baton Rouge, La.

Comments. Harry Clark, Fisher Lumber Company, Wisner, La.

4. "Effect of Siltation on Trout Streams." Lee B. Tebo, Sr., Wildlife Resources Commission, Raleigh, N. C.

Comments. Thomas C. Nelson, Athens-Macon Research Center, Athens, Ga.

5. "Deer and Turkey in Missouri's Managed Forests." Robert L. Dunkeson, Missouri Conservation Commission, Columbia, Mo.

Comments. Leon Hornkohl, Missouri National Forests, Rolla, Mo.

The Annual Dinner

Wednesday Evening, October 17

George A. Garratt, Toastmaster

Award of the Sir William Schlich Memorial Medal.

Award of the Gifford Pinchot Medal.

First awards by the Society of American Foresters for outstanding achievement in biological research contributing to the advancement of forestry.

Address by Hodding Carter, editor of the *Delta Democrat Times*, Greenville, Miss.

Entertainment.

Social Evening

Tuesday evening, October 16, will be devoted to social activities, centering around "A Night on Beale Street." All members, their ladies, and guests are cordially invited.

Ladies' Activities

Sunday, October 14. A special get acquainted tea has been arranged by the Ladies' Committee in the ballroom of the Peabody Hotel, from 4 p.m. to 6 p.m. All members, their ladies, and guests are welcome.

Monday, October 15. A special 35-mile tour of Memphis and the levee by bus, leaving the Peabody Hotel at 11 a.m. The ladies will call at the Nickey-Eason plantation, visit a cotton gin, and see cotton being picked

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Book shows the relationships of forests to rainfall and temperature; to relief and soils; to human populations; and to human institutions, needs, etc. Provides insight into the struggle between conservationists and their opponents. *58 maps, 111 ills.; 750 pp.* **$12.50**

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U.S. Forest Service

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in the field. A barbecue luncheon will be served. Return to the hotel about 4 p.m.

Tuesday, October 16. The ladies forestry forum will be held in the morning with Miss Alma Deane Fuller as the speaker. Forestry motion pictures will be shown. Brunch will be served. There will be special activities during the evening.

Wednesday, October 17. A tour has been arranged, leaving the Peabody Hotel at 11 a.m., to the city hospital center, Brooks' Art Gallery, and other places of interest. Luncheon will be served at the Memphis Country Club, and a fashion show will be featured. Return to the hotel about 3 p.m.

Ladies wishing to participate in all the foregoing activities will be charged a fee of $8 at the time of registration.

Field Trips

Two wood trips and two industry trips are being arranged for October 18 and 19, following the three-day course of meetings and technical sessions. A pair of these trips, composed of one of each type, will be conducted concurrently each day. The pairs are matched as to subject matter and scope.

The woods trips are intended to give as clear a view as possible in a short time of the silvics, actual and potential productivity, and management possibilities and requirements of southern hardwoods. Measured and marked plots will be shown and discussed from all angles in the light of the general situation observed.

The industry trips should convey a fair comprehension of the raw material requirements, manufacturing methods, and types of product of the principal industries using hardwood saw timber and lumber.

In addition, there will be two trips of particular concern to the Division of Watershed Management, but they should be of interest to anyone.

These are not primarily sight seeing trips. Rather they are technical in character. There is no other single locality where so much can be seen and learned regarding hardwood forests, forestry, and wood utilization.

Ladies will be welcome on all trips except the woods trip on Friday. No special clothing is necessary but sturdy walking shoes are desirable.

Thursday, October 18

1. This industry trip will include the plants of:

Memphis Plywood Corporation to see the production of fine rotary face and commercial veneers and construction of hardwood panels.

Chapman and Dewey Lumber Company, principally to see the manufacture of standard hardwood lumber and, from it, boxes and shooks.

E. L. Bruce Company to see the manufacture of a wide variety of hardwood flooring from common oak lumber and furniture parts from other species.

Memphis Furniture Company to see the working up of hardwood lumber into parts and fabrication of furniture; or Norton Manufac-

Working trees for Gum Naval Stores in Southeast returns additional income to timber land owners.

The double head nail, tack-on tin installation assures full utilization of the entire tree when harvested for Forest Products.

Forester demonstrates new technique to land owners.

American Turpentine Farmers Association
General Offices: Valdosta, Georgia

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Your friends will exclaim over and treasure these charming, novel CARDS OF WOOD. Wafer-thin, flexible, made of Holly, Pine, Cedar and other exquisitely grained woods, 3¾" x 4¾", printed with appropriate designs and messages.

Special Offer: Send only $1. for 5 assorted beautiful cards with protective card, envelopes and illustrated folder. You'll want to re-order before Christmas!

BOOKMARKS OF WOOD make attractive, inexpensive gifts. Made of the same lustrous, satiny woods, gay with colored ribbons and lustrous tree decorations. $1. for 3 all different, with greeting cards, envelopes. Order Now!

Business Cards, Announcements, Menus

CARDS OF WOOD Manlius 13, New York

What would you do with land like this?

Typical scrub oak growing on land suitable for southern pine pulpwood. Cut for saw timber years ago, no provision was made for regeneration in slash, loblolly or longleaf pines.

Ready for planting. This huge tract in Rayonier's Nassau, Florida, Forest, cleared of scrub oak and palmetto, is now replanted with slash pine seedlings providing useful timber for tomorrow.

Rayonier's dynamic conservation puts undeveloped land into timber

Thousands of acres of poorly drained land and oak ridges have recently been reclaimed by Rayonier foresters in Georgia and Florida as part of our long-range conservation program.

Now these unproductive tracts are planted to pine for our Southeast chemical cellulose mills. Other areas are brought into timber production as fast as Rayonier foresters can run drainage ditches and remove weed trees and other undesirable vegetation that frequently overtop young pine or compete with larger ones for growing space and nutrition.

Meanwhile in the Pacific Northwest and British Columbia our technical forestry likewise promotes maximum timber growth plus increased growth potentials of the land for future tree crops. Considerable forestry research; advanced protection from fire, disease and insect blight; scientific thinning and harvesting; all bring in larger, healthier crops.

You'll agree that such efforts constitute wise utilization of a prime natural resource, contributing to the dynamic conservation which helps insure abundant timber for the future.

RAYONIER
INCORPORATED

cellulose chemistry

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CONSERVATORS of that resource in preventing forest fires and promoting new growth.
COLLABORATORS with our contemporaries throughout the industry who are dedicated to Keeping America Green.
TREE FARM
BRADLEY LUMBER COMPANY of Arkansas
WARREN, ARKANSAS

turing Company to see the manufacture of tie plugs and specialties from bolts.

2. The woods trip will be to the Shelby Forest; 12,000 acres operated by the Tennessee Park Service northeast of Frayser. Here the general contrast between the upland or loessal bluff and the bottomland forests can be observed with typical variations in each. Good cottonwood, cypress, poplar, oak, and other species will be seen on their respective sites and their possibilities and needs discussed. Also, there has been a remarkable restocking to very promising sapling and pole stands on a great acreage of ruined farm woods and pastures which merits analysis and discussion.

3. The watershed trip will be to inspect the setting and the work of the Yazoo-Little Tallahatchie Flood Control Project, conducted upstream from the big flood control reservoirs in northwestern Mississippi. Here the Forest Service and the Soil Conservation Service are applying various techniques and approaches to ameliorate conditions on some 4 million acres of the most spectacularly eroded, formerly prosperous, agricultural territory in North America. One phase of the progress being made was the planting of 40 million pine seedlings.

Friday, October 19

1. The industry trip will include the plants of:

Nickey Brothers, Inc. to see principally production of fine veneers of several kinds and construction of hardwood panels.

Anderson-Tully Company, principally to see the production of standard hardwood lumber and fabrication of automobile and furniture parts, and other items from lumber and rotary veneer.

A flooring producer to see manufacture of hardwood flooring from common grades of standard lumber.

Chas. O. Cox Company to see the manufacture of shuttle blocks, golf heads, striking tool handles, etc.

2. The woods trip will be to a property of the Anderson-Tully Company in the Mississippi bottomlands west of Ripley, Tenn. Premium, large old growth has undergone three and four conservative, marked cuttings with apparent good results. Spot planting of walnut has been successful. The two basic general bottomland forest types are represented in unusually clear contrast in about optimum development.

3. The watershed trip will be made to inspect the Waterways Experiment Station of the Corps of Engineers, U. S. Army at Vicksburg, Miss. This is a world famous installation, doing work on the hydraulics of stream flow. Exact-scale working models of various river and harbor systems, including the entire Mississippi basin under construction over more than 200 acres, are available for inspection. The whole installation, including the work of an elaborately equipped Soils Division, will be shown and discussed. The Vicksburg Infiltration Project of the Southern Forest Experiment Station has been carrying on research for the Corps, bearing on the relation of soil, vegetation, and climatic conditions to mobility of military vehicles.

Transportation

Transportation will be arranged for all trips, but those wishing to use private cars may do so except for the industry tours.

Transportation for the trip to the Yazoo-Little Tallahatchie Watershed will be so arranged that those wishing to return to Memphis may do so and those intending to tour the Waterways Experiment Station may go on down to Vicksburg conveniently. Those wishing to go directly from Memphis to Vicksburg will find either the plane trip or drive convenient; the distance is 225 miles. A bus trip is feasible but tedious. The plane schedule may permit taking in one of the Memphis trips. Those arriving in Vicksburg without local transportation may participate in the arranged facilities there.

Fordyce Grows HARDWOODS, Too!...

As pioneers in forest management, Fordyce was among the first in the South to inaugurate sound management practices in pine.

Prompted by the results of that program, Fordyce several years ago recognized the rapid growth of some hardwoods which was equal to or even greater than that of pine.

With this evidence supplementing new phases of hardwood silviculture, Fordyce elected to extend its forest management program so that today it embraces holdings of both hardwoods and pine.

This provides a broad field of accomplishment to the members of the Fordyce Forest Management staff.

"Great oaks still do grow from little acorns... and the systematic planting of the right kind of acorns today will produce the right kind of saw timber tomorrow."

Since 1889

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  With Preheating Burner
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  For Estimating Basal Area

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Members may obtain further information about the trips and costs of tickets at the time of registration.

Other Places of Interest

Lack of time during an already crowded week precluded combining two other important projects in organized trips. Members who are interested may make personal arrangements for seeing them.

At Grand Junction, Tenn., 50 miles due east of Memphis, the University of Tennessee is conducting pilot scale research into the practical economic aspects of rehabilitation and modernizing a run-down 20,000-acre cotton plantation. Forest management necessarily plays a very important part, involving fundamental problems of land use, credit, etc. Conservative cutting and coordinated utilization and marketing of stumpage, logs, and lumber are being practiced. A sawmill and treating tank are operated on the property. Stand improvement deadening and planting are underway in both hardwood and pine. Solon Baraclough, Ames Plantation, Grand Junction, is in charge and will welcome inquiries.

Between Grand Junction and Memphis, the Wolf River Watershed Association is operating under the Small Watersheds Act on an area of 460,000 acres. The physical situation is much the same as in the Yazoo-Tallahatchie area, but progressive private and local interests are more active, the need for protecting the great federal reservoirs as in Mississippi being absent. Information and directions can be obtained from John R. Aycock, area conservationist, Room 3, Post Office Building, Memphis.

Hotel Reservations

Those expecting to attend the meeting are urged to arrive in Memphis on Sunday, October 14, or not later than Monday morning, October 15.

MEMPHIS, TENNESSEE
THE NATION'S HARDWOOD CAPITOL
Welcomes 1956 S. A. F. Meeting

Nickey Brothers, Inc., producers of "None-Better" hardwood products since 1866, takes this opportunity to welcome the members of the Society of American Foresters to attend the 1956 Annual Meeting at Memphis, Tennessee.

We are managing the hardwoods on our own lands, and also the tree farms of the NICKEY TREE FARM FAMILY.

NICKEY BROTHERS, INC.
MEMPHIS, TENN.

The first general session starts on Monday morning.

The Peabody Hotel will be the headquarters for the meeting. The Peabody has 625 rooms, but it will not be able to accommodate all those in attendance, hence other hotels are making space available.

However, all members who desire to stay at the headquarters hotel should send their reservations direct to the Peabody. Assignments will be made at, or as near, the desired rate as possible. Requests for rooms will be filled by the Peabody in the order of their receipt until the number of rooms available has been exhausted. The Peabody will then refer reservations that it cannot fill to other cooperating hotels. Early reservations are desirable.

The reservation coupon printed in the September issue, page 608, may be used. Readers who do not want to cut the coupon in their JOURNALS may request reservations by letter by providing all the information listed on the coupon.

As is usual, single rooms may be scarce, hence when possible twin bed rooms should be requested.

Members who prefer hotels other than the Peabody may write them direct, being sure to state that the reservations requested are for the meeting of the Society of American Foresters.

Hotels

Peabody Hotel, 149 Union Avenue, Memphis 1, Tenn. 600 rooms. Single rooms, $5 to $11; double rooms for two, $6.50 to $13; twin-bed rooms, $9 to $15; suites, $19 to $35.

Chisca Hotel, Main and Linden Streets (zone 1). 400 rooms. Single rooms, $4.25 to $7.50; double rooms, $6.25 to $10; twin-bed rooms, $8 to $11.

Claridge Hotel, Main and Adams Streets (zone 4). 400 rooms. Single rooms, $4.50 to $10; double rooms, $7 to $14; twin-bed rooms, $8 to $14.

Gayoso Hotel, 139 Main Street (zone 1). 200 rooms. Single rooms, $5 to $9; double rooms, $7 to $12; twin-bed rooms, $8 to $13; suites, $18 to $30.

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with tree trimming tools especially designed for the job.

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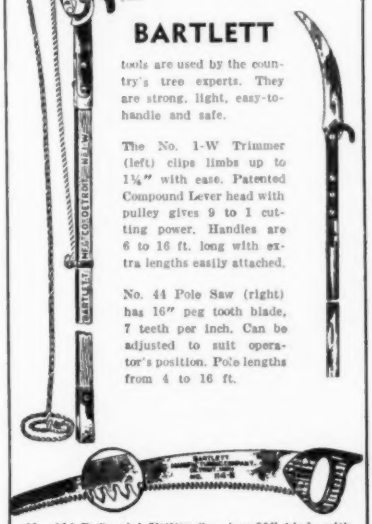
tools are used by the country's tree experts. They are strong, light, easy-to-handle and safe.

The No. 1-W Trimmer (left) clips limbs up to 1¼" with ease. Patented Compound Lever head with pulley gives 9 to 1 cutting power. Handles are 6 to 16 ft. long with extra lengths easily attached.

No. 44 Pole Saw (right) has 16" peg tooth blade, 7 teeth per inch. Can be adjusted to suit operator's position. Pole lengths from 4 to 16 ft.



No. 114-B Special Utility Saw has 26" blade with diamond point teeth. Extra large grip permits wearing of gloves. Available with or without "On and Off" belt snap.

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King Cotton Hotel, Jefferson at Front Street (zone 1). Single rooms, $4.75 to $8.75; double rooms, $6.75 to $10; twin-bed rooms, $8 to $14.75.

Wm. Len Hotel, Main and Monroe Streets (zone 3). 250 rooms. Single rooms, $3.50 to $5; double rooms, $5 to $6.50; twin-bed rooms, $6.50 to $7.50; suites, $15; and a few large rooms available with four single beds in each for $10.75 for four persons.

Tennessee Hotel, 3rd at Union Avenue. 200 rooms. Single rooms, $2.50 to $6; (air conditioned, $3.50 to $6); double rooms, $4 to $7 (air conditioned, $5 to $7.50); twin-bed rooms, $7 (air conditioned, $7.50).

Motels and Tourist Courts

There are a number of motels and tourist courts in and near Memphis. Those wishing this type of accommodation may obtain a list of them, together with their rates and locations, from the Convention Bureau, Memphis Chamber of Commerce, P. O. Box 224, Memphis, Tenn.

Usually an advance deposit is necessary to hold a reservation at a motel or tourist court.

Committees for the Meeting

Russell Stadelman is general chairman for the meeting. His address is Nickey Brothers, Inc., 2700 Summer Avenue, Memphis 12, Tenn.

Assisting him are the following committees and their personnel.

Program Committee

Philip A. Briegleb is chairman of the Program Committee. His address is Southern Forest Experiment Station, 704 Lowich Building, 2026 St. Charles Avenue, New Orleans 13, La.

The other members of the committee are Glen R. Durrell, Richard Kilbourne, Charles H. Kirk, and Harrod B. Newland.

Committee on Arrangements

Wharton Z. Hawkins is chairman of the Committee on Arrangements. His address is Nickey Brothers, 2700 Summer Avenue, Memphis 12, Tenn.

The following special assignments have been made to the Committee on Arrangements.

Information and Publicity. James O. Artman.

Registration and Welcome. John W. Lehman.

The Annual Dinner. C. F. Grafton.

Field Trips. John A. Putnam, Carl I. Peterson.

Meeting and Conference Rooms. Richard L. Burkhart.

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SWATTERS — LW-12 FIRE RAKES — BUSH HOOKS — AXES

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Scientific management of forests and assistance to neighboring tree farmers assure a perpetual supply of Frost and Frostkraft products.

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IT'S A FACT—the "Sterling 12 Star" Laboratories have been able to produce even brighter and longer-lasting colors for TREE MARKING PAINT. For years the nation's professional foresters from coast to coast have preferred "Sterling 12 Star" TREE MARKING PAINT because of its brighter colors, freedom from clogging, and ease of thinning. All these features have added up to make this product the most economical to use, due to savings in time, and freight. "Sterling 12 Star" TREE MARKING PAINT in SEMI-PASTE continues to be the favorite from Maine to California.

Because of increased demand, "Sterling 12 Star" TREE MARKING PAINT is now available in READY-MIXED form. It is the same fine product that has been preferred by foresters for years, but it is ready-to-use. Packed in handy easy-carrying, easy-pouring varnish-type cans, it saves the trouble of carrying a reducer, and mixing. READY-MIXED is available in the same brilliant, long-lasting colors as the semi-paste form, and is formulated to virtually eliminate any settling. For many forestry operations, this is the ideal packaging of "Sterling 12 Star" TREE MARKING PAINT.

Years of field testing have indicated that "Sterling 12 Star" TREE MARKING PAINT (in either semi-paste or ready-mixed form) is most practical for boundary marking. For prices, color cards and other information, please write to either of the addresses below.

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Ladies Activities. Mrs. W. Jeter Eason.

Social Night. A. K. Dexter, William T. Hawkins.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatements received in the Society office during the month of August are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of November 1, 1956. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Junior Grade

Sushko, W. C., Watershed Forester, Baltimore City Bureau of Water Supply, Baltimore, Md. (Affiliate 1954).

Member Grade

Harris, C. D., Principal Forest Ranger, Dept. of Forests & Waters, Wellsboro, Pa.; Pa. State, B.S.F., 1953. (Junior, 1953).

Karnig, J. J., Asst. Dist. Forester, Dept. of Forests & Parks, Frederick, Md.; State Univ. of N. Y., B.S.F., 1951. (Junior, 1951).

Lylo, N., Asst. Dist. Forester, Pa. Dept. of Forests & Waters, Renovo, Pa.; Pa. State, B.S.F., 1952. (Junior, 1952).

Peterson, D. E., Dist. Forester, Hammermill Paper Co., Smethport, Pa.; State Univ. of N. Y., B.S.F., 1950. (Junior, 1951).

Reed, M., Consulting Forester, Tillinghast & Reed, Madison, W. Va. (Junior, 1950).

Richardson, J. M., Forester, N. J. Dept. of Cons. & Eco. Dev., Toms River, N. J.; State Univ. of N. Y., B.S.F., 1951. (Junior, 1952).

Appalachian Section

Junior Grade

Swanson, S. R., County Forester, N. C. Forest Service, Newton, N. C.; N. C. State, B.S.F., 1940.

Member Grade

Anderson, W. C., Forest Economist, U.S.F.S., Asheville, N. C.; Pa. State, B.S.F., 1948. (Junior, 1950).

Archibald, P. L., Forester, U.S.F.S., Pisgah Forest, N. C.; Univ. of Maine, B.S.F., 1949; Univ. of Mich., M.F., 1953. (Junior, 1952).

Babbitt, R. P., Forester, W. Va. Pulp & Paper Co., Charlottesville, Va.; Univ. of Mass., B.S.F., 1950. (Junior, 1952).

Bell, C. T., Asst. Mgr., Canal Wood Corp., Conway, S. C.; State Univ. of N. Y., B.S.F., 1953. (Junior, 1953).

Broyles, H. H., Forester, Va. Div. of Forestry, Farmville, Va.; Univ. of Ga., B.S.F., 1951. (Junior, 1951).

Calhoun, H. K., Service Forester, Va. Div. of Forestry, Abingdon, Va.; W. Va. Univ., B.S.F., 1952. (Junior, 1953).

Campbell, P. O., Forester, International Paper Co., Georgetown, S. C.; N. C. State, B.S.F., 1950. (Junior 1953).

Cavanaugh, M. J., Dist. Forester, Champion Paper & Fibre Co., Newberry, S. C.; N. C. State, B.S.F., 1950. (Junior, 1951).

Crider, J. M., Timberland appraiser, W. Va. Pulp & Paper Co., Orangeburg, S. C.; Univ. of Ga. B.S.F., 1951. (Junior, 1951).

Diehl, P. B., Forester, Va. Tbr. Co., Altavista, Va.; Pa. State, B.S.F., 1951. (Junior, 1952).

Hawes, R. B., Forester, Lightsey Bros., Miley, S. C.; Duke, M.F., 1951. (Junior, 1951).

Horn, F. W., Forester, S. C. Comm. of Forestry, Kingstree, S. C.; Univ. of Idaho, B.S.F., 1950. (Junior, 1952).

Huntemann, J. W., Forester, McNamee Lbr. Co., Bath, S. C.; Univ. of Ga., B.S.F., 1951. (Junior, 1951).

Nelson, W. R., Forest Supv., Union Bag & Paper Corp., Ridgeland, S. C.; Univ. of Ga., B.S.F., 1951, (Junior, 1951).

Peery, G. W., Forester, Va. Div. of For-

Forest Fire Insurance

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The
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estry, Chatham, Va.; Mich. State, B.S.F., 1950. (Junior, 1951).
Ralston, J., Unit Forester, International Paper Co., Aiken, S.C.; W. Va. Univ., B.S.F., 1550. (Junior, 1951).
Ross, V. R., Mill Mgr., Draper Corp., Swannanoa, N. C.; N. C. State, B.S.F., 1951. (Junior, 1952).
Searey, W. H., Forester, Va. Div. of Forestry, Halifax, Va.; N. C. State, B.S.F., 1950. (Junior, 1951).
Shipman, R. D., Research Forester, U.S. F.S., Charleston, S. C.; Univ. of Mich., B.S.F., 1947; Mich. State, Ph.D., 1952. (Junior, 1951).
Slusser, N. F., Dist. Fire Chief, Va. Div. of Forestry, Farmville, Va.; Pa. State, B.S.F., 1953. (Junior, 1953).
Storey, T. G., Forester, Southeastern Forest Expt. Sta., Asheville, S. C.; Univ. of Calif., B.S.F., 1948. (Junior, 1953).
Sweetland, T. W., Forester, Continental Can Co., Inc., Hopewell, Va.; W. Va. Univ., B.S.F., 1951. (Junior, 1951).
Tarbox, G. L., Forester, Brookgreen Gardens, Inc., Georgetown, S. C.; Mich. State, B.S.F., 1952; Purdue, M. F., 1954. (Junior, 1952).
Vernam, W. C., Forester, Va. Div. of Forestry, Charlottesville, Va.; State Univ. of N. Y., B.S.F., 1951 (Junior, 1951).

Affiliate Grade

Hayes, J. C., Supt., Va. Div. of Forestry, Cumberland, Va.
Newman, H. O., Forester, W. Va. Pulp & Paper Co., Charleston, S. C.
Peterson, L. D., Dist. Supt., W. Va. Pulp & Paper Co., Walterboro, S. C.

Central Rocky Mountain Section

Member Grade

Yurich, S., Dist. Forest Ranger, U.S.F. S., Cody, Wyo.; Colo. A & M, B.S.F., 1953. (Junior, 1953).

Central States Section

Member Grade

Heazlit, C. E., Farm Forester, Ohio Div. of Forestry, Portsmouth, Ohio; Univ. of Mich., B.S.F., 1949. (Junior, 1952).
Lowry, G. L., Instructor, Ohio Agric. Expt. Sta., Wooster, Ohio; Pa. State, B.S.F., 1953; Ore. State, M.S., 1955. (Junior, 1953).

Columbia River Section

Member Grade

Keiser, D. F., Tbr. Mgmt. Asst., U.S. F.S., Mapleton, Ore.; Pa. State, B.S. F., 1950; Ore. State, M.F., 1955. (Junior, 1951).
Kilen, G. F., Staff Forester, Weyerhaeuser Tbr. Co., Klamath Falls, Ore.; Univ. of Minn., B.S.F., 1949. (Junior, 1952).
Lee, R. E., Logging Engr., Crown Zellerbach Corp., Cathlamet, Wash.; Univ. of Wash., B.S.F., 1953. (Junior, 1953).
McMahon, R. O., Research Forester, U. S.F.S., Portland, Ore.; Univ. of Idaho, B.S.F., 1951. (Junior, 1951).
Petrie, K., Asst. Mgr., Fir-Tex Insulating Board Inc., St. Helens, Ore.; Ore. State, B.S.F., 1952. (Junior, 1952).
Powers, R. D., Tbr. Sales Asst., Ore. State Board of Forestry, Forest Grove, Ore.; Ore. State, B.S.F., 1949. (Junior, 1949).

Affiliate Grade

Nesheim, C. S., Dist. Forest Warden, Ore. State Board of Forestry, Medford, Ore.

Gulf States Section

Student Grade

LOUISIANA POLYTECHNIC INSTITUTE

Garland, G. O. McCain, D. L.
Henderson, D. W. Todd, C. M.
Holmes, J. L. Trigg, N.

Junior Grade

Gaudin, O. B., Forester, American Creosote Works, Inc., Winnfield, La.; L.P.I., B.S.F., 1954.
Jordan, F. M., Rt. 2, Bassfield, Miss.; La. State, B.S.F., 1956. (Student, 1955).
Wilbur, E. C., Woodland Conservationist, Soil Cons. Service, Huntsville, Texas; Univ. of Calif., B.S.F., 1935.

Member Grade

Bryant, R. L., Asst. Prof., McNeese State College, Lake Charles, La.; La. State, B.S.F., 1953; M.S., 1954. (Junior, 1953).
Burkhardt, E. C., Forester, Anderson-Tully Co., Memphis, Tenn.; A.P.I., B.S.F., 1950. (Junior, 1951).
Burnham, J. W., Cons. Forester, Ma-

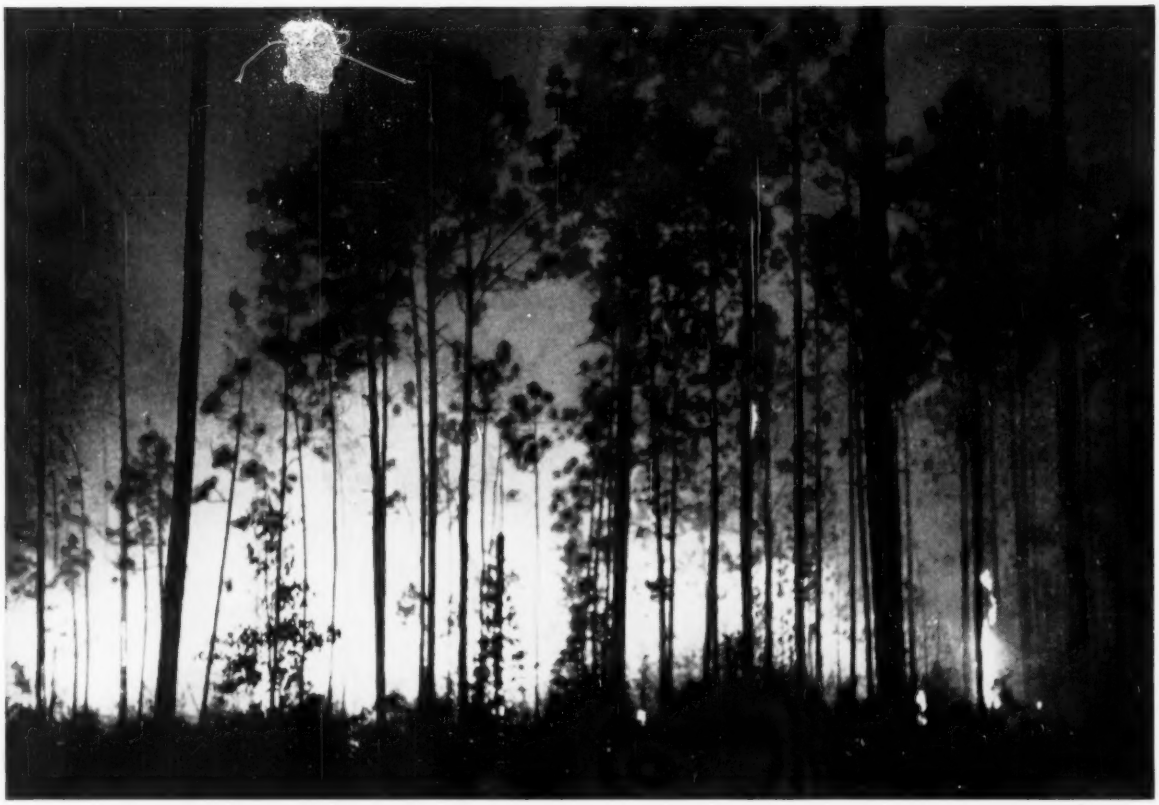
Growing Trees for Future Generations

WEST COAST TREE FARMS
AFFILIATED WITH AMERICAN TREE FARMS
This Certifies that the forest lands of
SNOW PEAK LOGGING DIVISION
OF WILLAMETTE VALLEY LUMBER COMPANY
are being protected and managed under continuously applied forest practices for the continuous production of commercial forest crops.
In recognition thereof, these lands are hereby designated a WEST COAST TREE FARM by the Joint Committee on Forest Conservation

WEST COAST TREE FARMS
AFFILIATED WITH AMERICAN TREE FARMS
This Certifies that the forest lands of
WILLAMETTE VALLEY LUMBER COMPANY
are being protected and managed under continuously applied forest practices for the continuous production of commercial forest crops.
In recognition thereof, these lands are hereby designated a WEST COAST TREE FARM by the Joint Committee on Forest Conservation

Maintaining two West Coast Tree Farms is an important part of our program of protecting and managing forest lands to insure the continued growth of this great natural heritage.

WILLAMETTE VALLEY LUMBER CO.
WILLAMETTE NATIONAL LUMBER CO.
SANTIAM LUMBER CO.



it's later than you think

Three out of every four forest fires in the country last year were in the South! So was 84% of the area burned!

These appalling facts were brought out in the Southern Forest Fire Prevention Conference in New Orleans this Spring.

If our priceless forests are to be kept intact, we must act now. Here are some of the things that can be done—

Local education. Teach the vital importance of fire prevention in every community.

Stricter fire law enforcement. Get behind our foresters. Judges, juries, sheriffs, everyone should come out for swift and full punishment of violators who are burning up the South's natural wealth.

Local meetings. Get every influential person in your community and state to discuss this matter.

Organize. Stay organized, keep active . . . support the local effort!

It's later than you think!

International Paper COMPANY
SOUTHERN KRAFT DIVISION
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Our foresters' story on film

Kimberly-Clark Corporation has available a new type of film on forestry. It's the story of the day-to-day activities of our own foresters, recorded on 16mm color film as they worked. Cutting, driving the pulpwood, hauling, regeneration studies, nursery operation and restocking — all are shown with a realism that makes the job live for the layman.

About 27 minutes long, this film can be obtained on loan from the Public Relations Department, Kimberly-Clark Corporation, Neenah, Wisconsin.

KIMBERLY-CLARK CORPORATION NEENAH, WISCONSIN

sonite Corp., Laurel, Miss.; A.P.I., B.S.F., 1951. (Junior, 1951).

Burton, K. L., Dist. Forester, Texas Forest Service, Lufkin, Texas; La. State, B.S.F., 1951. (Junior, 1951).

Corley, J. C., Area Forester, Gaylord Container Corp., Lone Beach, Miss.; W. Va. Univ., B.S.F., 1950. (Junior, 1951).

Davis, H. O., Forester, Gaylord Container Corp., Bogalusa, La.; Purdue, B.S.F., 1952; M.F., 1956. (Junior, 1952).

Heinz, R. E., Forest Entomologist, Gaylord Container Corp., Bogalusa, La.; Univ. of Mich., B.S.F., 1953. (Junior, 1953).

Hennigan, J. T., Area Forester, Gaylord Container Corp., Bogalusa, La.; La. State, B.S.F., 1951. (Junior, 1953).

Holt, W. R., Forest Entomologist, U.S. F.S., Gulfport, Miss.; Pa. State, B.S. F., 1952; M.F., 1956. (Junior, 1952).

Jameson, D. E., Forester, Miss. Products Inc., Jackson, Miss.; State Univ. of N. Y., B.S.F., 1942. (Junior, 1951).

Lloyd, D. W., Miss. Agency Mgr., Southern Tbr. Mgmt. Service, Inc., McComb, Miss.; Univ. of Calif., B.S. F., 1949. (Junior, 1952).

Powell, D. H., Asst. Wood Procurement Supt., International Paper Co., Kosciusko, Miss.; Univ. of Mich., B.S.F., 1950. (Junior, 1951).

Todd, J. E., Mgmt. Forester, Gaylord Container Corp., Bogalusa, La.; W. Va. Univ., B.S.F., 1950. (Junior, 1952).

Affiliate Grade

Craft, M. D., Forester, Powell Lbr. Co., Lake Charles, La.

Koski, D. J., Forest Tech., International Paper Co., Carthage, Miss.; Mich. College of Mining & Tech., B.S., (Forestry), 1953.

McCauley, W. H., Box 174, Garrison, Texas; Stephen F. Austin State College, B.S., (Forest Mgmt.), 1956.

New England Section

Junior Grade

Combes, J. A., 34 John St., Ridgewood, N. J.; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Curtis, C. R., Harrington, Maine; Univ. of Maine, B.S.F., 1956. (Student, 1956).

Fiske, R. B., 15 Middlefield Dr., W. Hartford, Conn.; Univ. of Maine, B. S.F., 1956. (Student, 1954).

Funking, D. L., 120 Hartsdale Ave., Hartsdale, N. Y.; Univ. of Maine, B.S.F., 1956. (Student, 1954).

Gammons, R. L., U.S.F.S., Bartow, W. Va.; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Kupa, J. J., 19 Arbutus Road, Worchester, Mass.; Univ. of Maine, B.S. F., 1956. (Student, 1956).

Leslie, R. E., 256 Beale St., Wollaston, Mass.; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Long, L. E., R.F.D. 1, Bethel, Conn.; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Lonn, V. R., 456 Middle St., Bath, Maine; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Ludwig, J. E., Theta Chi, Orono, Maine; Univ. of Maine, B.S.F., 1956. (Student, 1954).

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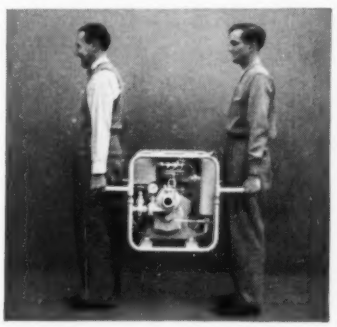

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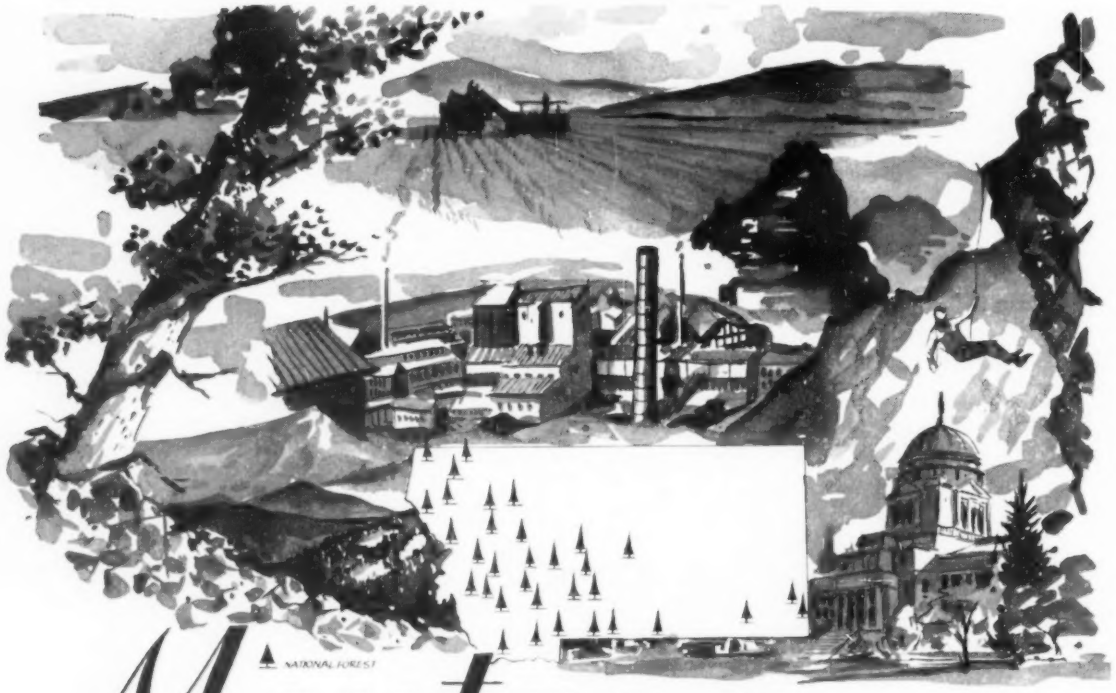

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McCormack, M. L., 9 Hampton Rd., Cranford, N. J.; Univ. of Maine, B. S.F., 1956. (Student, 1954).

Mitchell, W. C., Box 337, Parsons, W. Va.; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Morrill, W. J., 40 Walter St., Bangor, Maine; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Shaw, P. A., Star Rt., Leavenworth, Wash.; Univ. of Maine. B.S.F., 1956. (Student, 1955).

Shedd, E. W., North Ferrisburg, Vt.; Univ. of Maine. B.S.F., 1956 (Student, 1955).

Towle, E. L., Gen. Del., Bridgewater, Va; Univ. of Maine, B.S.F., 1956. (Student, 1955).

Member Grade

Grove, E. R., Forester, Maine Forest Service, Augusta, Maine; Univ. of Maine, B.S.F., 1951. (Junior, 1951).

New York Section

Member Grade

Curtis, R. O., Research Forester, Northeastern Forest Expt. Sta., Paul Smiths, N. Y.; Yale, B.S.F., 1950; M.F., 1951. (Junior, 1952).

Hamilton, L. S., Associate Prof., Cornell Univ., Ithaca, N. Y.; Univ. of Toronto, B.S., (Forestry), 1948; State Univ. of N. Y., M.F., 1950. (Junior, 1951).

Hibbard, W. F., Self employed, 120 Demars Blvd., Tupper Lake, N. Y.; Univ. of Maine, B.S.F., 1950. (Junior, 1951).

Patterson, W. C., Forester, Ward Lbr. Co., Jay, N. Y.; State Univ. of N. Y., B.S.F., 1951. (Junior, 1951).

Smith, R. L., Forester, N. Y. State Cons. Dept., Oneonta, N. Y.; State Univ. of N. Y., B.S.F., 1951. (Junior, 1951).

Northern California Section

Junior Grade

Cuff, K. A., Forester, Southern Pacific Land Co., San Francisco, Calif.; Univ. of Calif., B.S.F., 1941.

Meyer, D. S., 528 Arden, Glendale, Calif.; Univ. of Calif., B.S.F., 1956. (Student 1954).

Member Grade

Chandler, C. C., Research Forester, Calif. Forest & Rge. Expt. Sta., Berkeley, Calif.; Univ. of Calif., B.S.F., 1951; M.F., 1955. (Junior 1951).

Gentry, G. I., Resident Forester, Sage Land & Lumber Co., Garberville, Calif.; Univ. of Calif., B.S.F., 1953. (Junior 1953).

Gilliam, L. N., Forest Tech., The Pacific Lbr. Co., Scotia, Calif.; Mont. State, B.S.F., 1951. (Junior 1953).

Green, F. L., Asst. Forester, The Pacific Coast Co., Willits, Calif.; Ore. State, B.S.F., 1953. (Junior 1953).

Haussler, W. J., Park Ranger, Richardson Grove State Park, Garberville, Calif.; Univ. of Calif., B.S.F., 1948. (Junior 1953).

Pessner, H. O., Owner, West Coast Tbr. Products Agency, San Rafael, Calif. (Junior 1946).

Pland, R. H., Forester, Placerville Lbr. Co., Placerville, Calif.; Univ. of Calif., B.S.F., 1952. (Junior 1952).

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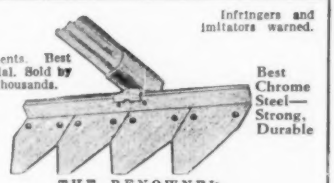

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Verdal, G. A., Forester, U.S.F.S., Libby, Mont.; Univ. of Idaho, B.S.F., 1950.

Affiliate Grade

Clinkenheard, J. T., Forester, U.S.F.S., Rexford, Mont.; Okla. A & M, B.S., (Forestry), 1956.

Grossarth, O. D., Forester, U.S.F.S., Libby, Mont.; Okla. A & M, B.S., (Forestry), 1956.

Puget Sound Section

Member Grade

Buchanan, J. L., Dist. Forest Warden, State of Wash., North Bend, Wash.; Univ. of Wash., B.S.F., 1952. (Junior 1952).

Campbell, D. G., Forester, Crown Zellerbach Corp., Port Townsend, Wash.; Mont. State, B.S.F., 1951. (Junior 1951).

Cochran, T. E., Field Forester, St. Paul & Tacoma Lbr. Co., Orting, Wash.; Iowa State, B.S.F., 1952. (Junior 1952).

Garey, C. A., Asst. Branch Forester, Weyerhaeuser Tbr. Co., Raymond, Wash.; Univ. of Calif., M.F., 1950. (Junior 1951).

Perske, R. A., Forester, U.S.F.S., Port Angeles, Wash.; Univ. of Minn.; B.S.F., 1953. (Junior 1953).

Affiliate Grade

Caryl, L. C., Forest Practice Forester, State Div. of Forestry, Omak, Wash.

Southeastern Section

Student Grade

UNIVERSITY OF GEORGIA

Cherry, C. W.
Gentry, J. B.
McAlexander, M. R.
Potts, J. A.
Ridgeway, T. R.
Solomons, S. B.
Willard, W. K.
Warner, R. A.
Yeager, G. L.

Junior Grade

Burns, J. T., 13 Harvey St., Rome, Ga. Reinstatement.

Rogers, C. J., Mgr., St. Regis Paper Co., Pensacola, Fla.; Mich. State, B.S.F., 1951.

Member Grade

Beall, J. W., Asst. Dist. Forester, Gulf States Paper Corp., Clanton, Ala.; A.P.I., B.S.F., 1949. (Junior 1951).

Blow, F. E., Gen. Del., Hartwell, Ga. (Junior 1947).

Brickman, T. L., Area Mgr., Rome Kraft Co., Rome, Ga.; Mich. State, B.S.F., 1949. (Junior 1951).

Cantelou, L. B., Asst. Dist. Forester, Hiwassee Land Co., Tuscumbia, Ala.; Duke, M.F., 1951. (Junior 1951).

Cantrell, J. O., Area Mgr., Gair Woodlands Corp., Rincon, Ga.; Duke, B.S.F., 1950. (Junior 1950).

Collier, M. L., Forest Mgr., St. Regis Paper Co., Pensacola, Fla.; Univ. of Fla., B.S.F., 1950. (Junior 1951).

Craven, F. E., Dist. Forester, Ga. Forestry Comm., Rome, Ga.; Univ. of Ga., B.S.F., 1951. (Junior 1952).

Forth, F. F., Forest Mgr., St. Regis Paper Co., Warwick, Ga.; Univ. of Fla., B.S.F., 1947. (Junior 1953).

Funkhouser, W. E., Area Mgr., Gair Woodlands Corp., Jasper, Fla.; W. Va. Univ., B.S.F., 1952. (Junior 1953).

Gaby, L. I., Forest Products Tech., U.S.F.S., Athens, Ga.; Univ. of Fla., B.S.F., 1951. (Junior 1952).

Gamble, R. J., Dist. Forester, Gulf States Paper Corp., Tuscaloosa, Ala.; A.P.I., B.S.F., 1951. (Junior 1951).

Greenwood, L. D., Forester, Atlantic Land & Improvement Co., Frostproof, Fla.; N. C. State, B.S.F., 1951. (Junior 1951).

Hammond, J. E., Forester, Ga. Forestry Comm., Waycross, Ga.; Univ. of Ga., B.S.F., 1949. (Junior 1953).

Hedden, R. E., Forester, Armstrong Cork Co., Pensacola, Fla.; Univ. of Ga., B.S.F., 1952. (Junior 1952).

Johnson, H. D., Asst. Mgr. St. Regis Paper Co., Jacksonville, Fla.; Colo. A & M, B.S.F., 1949. (Junior 1950).

Johnson, L. J., Asst. Forestry Supv., St. Regis Paper Co., Pensacola, Fla.; Univ. of Fla., B.S.F., 1951. (Junior 1951).

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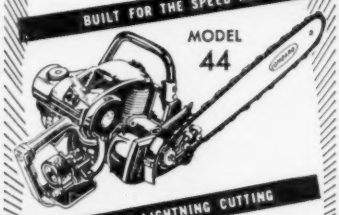

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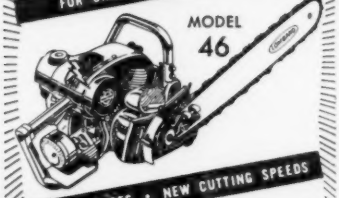

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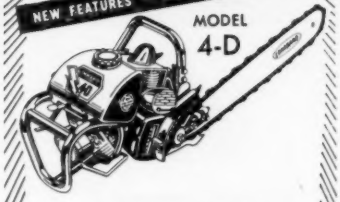

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Jones, F. E., Dist. Forester, Gulf States Paper Corp., Etaw, Ala.; A.P.I., B.S.F., 1950. (Junior 1951).

Lamond, L. D., Forester, Fort Stewart, Ga.; Univ. of Maine, B.S.F., 1950; Duke, M.F., 1951. (Junior 1953).

Lawyer, R. O., Area Forester, Fla. Forest Service, Baker, Fla.; Univ. of Fla., B.S.F., 1953. (Junior 1953).

Moore, E. O., Project Forester, Ala. Power Co., Birmingham, Ala.; A.P.I., B.S.F., 1949. (Junior 1951).

Rolston, K. S., Truckwood Supv., Coosa River Newsprint Co., Coosa Pines, Ala.; Pa. State, B.S.F., 1951. (Junior 1951).

Smith, R. F., Forester, International Paper Co., Opelika, Ala.; A.P.I., B.S.F., 1950. (Junior 1951).

Stanley, F. B., Asst. Forest Supv., Union Bag & Paper Corp., Brunswick, Ga.; Univ. of Ga., B.S.F., 1951. (Junior 1951).

Tanner, R. G., Hardwood Forester, The Buckeye Cellulose Corp., Foley, Fla.; A.P.I., B.S.F., 1952. (Junior 1952).

Vickery, W. W., Dist. Forester, Tenn. River Pulp & Paper Co., Jasper, Ala.; A.P.I., B.S.F., 1953. (Junior 1953).

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Member Grade

Brown, M. C., Forester, Chama Lbr. Co., Chama, N. Mex.; Colo. A & M, B.S.F., 1952. (Junior 1952).

Housley, R. M., Dist. Forest Ranger, U.S.F.S., Rimrock, Ariz.; Colo. A & M, B.S.F., 1952. (Junior 1952).

Lamb, A. J., Forester, U.S.F.S., Holbrook, Ariz.; Colo. A & M, B.S.F., 1950. (Junior 1951).

Upper Mississippi Valley Section

Member Grade

Carlson, R. W., Forester, Cornell Paperboard Products Co., Duluth, Minn.; Univ. of Minn., B.S.F., 1950. (Junior 1951).

Hertel, H. G., Nurseryman, Iowa Cons. Comm., Ames, Iowa; Iowa State, B.S.F., 1950. (Junior 1951).

Lindholm, V. V., Asst. Dist. Rgr., U.S.F.S., Isabella, Minn.; Univ. of Minn., B.S.F., 1950. (Junior 1950).

Associate Grade

Robertson, A. S., State Soil Scientist, Soil Cons. Service, St. Paul, Minn.; N. Dak. Agric. College, B.S., (Soils), 1932.

Will, G. F., General Mgr., Oscar H. Will & Co., Bismarck, N. Dak.; Harvard, B.A., (Biology), 1950.

Wisconsin-Michigan Section

Student Grade

UNIVERSITY OF MICHIGAN
Kinghorn, J. H.

Junior Grade

Chase, F. N. B., Forester, U.S.F.S., Shawano, Wis.; Univ. of Mass., B.S.F., 1949.

Member Grade

Berndt, H. E., Forest Mgr., Wis. Cons. Dept., Rhinelander, Wis.; Univ. of Mich., B.S.F., 1950. (Junior 1951).

Buell, D. L., Forester, Marathon Corp., Rothschild, Wis.; Univ. of Mich., B.S.F., 1946; M.F., 1947. (Junior 1951).

Karsten, N. J., Asst. Dist. Forester, Mich. Cons. Dept., Iron Mountain, Mich.; Mich. State, B.S.F., 1953. (Junior 1953).

Katovich, A., Asst. Dist. Forester, Wis. Cons. Dept., Appleton, Wis.; Iowa State, B.S.F., 1950. (Junior 1951).

Moore, L. C., Research, Kimberly-Clark of Mich., Inc., Niagara, Wis.; Mont. State, B.S.F., 1950. (Junior 1951).

Moran, J. J., Forester, Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Univ. of Mich., B.S.F., 1950. (Junior 1951).

Peterson, T. A., Extension Forester, Univ. of Wis., Madison, Wis.; Univ. of Mich., B.S.F., 1951; M.F., 1952. (Junior 1951).

Schmiege, D. C., Forest Entomologist, Wis. Cons. Dept., Hayward, Wis.; Univ. of Minn., B.S.F., 1952. (Junior 1953).

Seybold, W. H., Forester, Wis. Cons. Dept., Waupaca, Wis.; Purdue, B.S.F., 1951. (Junior 1951).

Sprick, E. W., Forester, State of Wis., Shawano, Wis.; Univ. of Minn., B.S.F., 1952. (Junior 1953).

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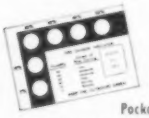

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Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University of New York College of Forestry.*

Range Management Section compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture.*

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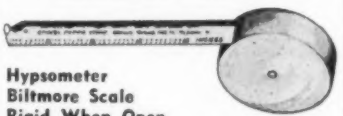

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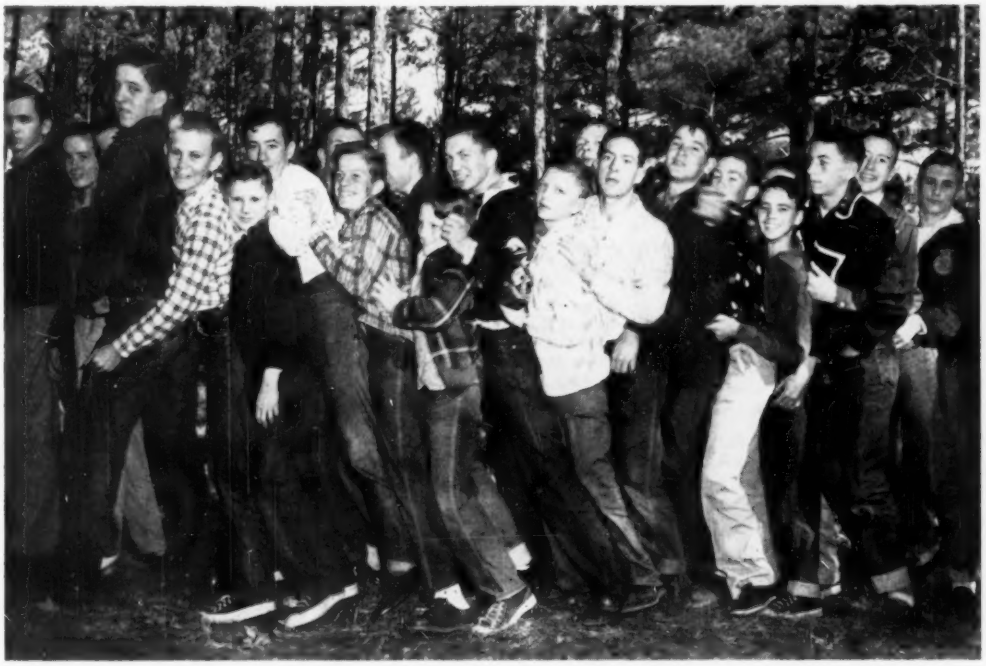

Club Boys in "chuck" line at Keep Washington Parish Green annual field day, Franklinton, La.

The South is a busy place these days! Just as these club boys are crowding and pushing, so are the region's wood using industries. It's a good thing that thousands of tree farmers are among the busiest people to be found, because only through their efforts can industry's huge appetite for second growth forests be satisfied.

In 1955 the paper industry alone consumed more than 18 million cords of wood. Millions of additional cords will be required annually to meet the demands of this ever expanding, gigantic industry.

The South has the forest area, the potential growing stock, the man power, and the markets. These factors assure its future destiny as one of the world's great timber producing regions.

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SOUTHERN PULPWOOD CONSERVATION ASSOCIATION

PRESENTS 15 YEAR PROGRESS REPORT—1939-1955

The southern pulp and paper industry organized the Southern Pulpwood Conservation Association in 1939 and continues to completely finance the activities. The membership comprises twenty-six pulp and paper companies representing approximately eighty-five percent of the total Southern pulpwood consumption. The area of operation extends from Virginia to Texas covering eleven southern states.

Pulpwood suppliers numbering one hundred and fifty and twenty-two associate members complete the membership.

This wood using industry association devotes its efforts toward helping the other fellow increase the per acre growth of his forest, thereby providing a continuous source of income to the landowner.

The following tabulation depicts the progress recorded in some of the more important phases of the program. A definition of the project headings follows:

Management assistance—industry forester makes recommendations covering general treatment of stand.

Marking Service—industry forester marks trees to be removed, leaving best for additional growth.

Demonstrations—industry forester, many times cooperating with other forestry agencies, initiates activity to provide forest information to groups.

Trees Planted—fee land means that owned by the industry; free to landowners is amount donated by industry.

Industry foresters—employed by pulp and paper industry. **Conservation foresters**—devoting full time to service work with private owners. **All other**—assigned to wood procurement and land management. Numbers of latter category also perform service work according to demand.

	1947	1948	1949	1950	1951	1952	1953	1954	Total
Management Assistance									
No. of Landowners		465	970	1650	2000	4000	5681	7748	22514
Acres (thousands)		942	644	600	642	1169	5716	5000	14713
Marking Service									
No. of Landowners		1035	1868	2830	2750	5300	6694	8500	28977
Acres (thousands)		91	126	200	156	282	378	482	1715
Cords Cut (thousands)		300	450	550	524	782	861	1000	4467
Demonstrations									
Number	245	340	635	915	940	1180	1022	977	6254
People (thousands)	4	7	30	17	13	25	26	24	146
Trees Planted (Millions)									
Fee Lands	19	44	44	41	52	102	138	138	578
Free to Owners	7	12	18	18	22	26	42	46	191
Total	26	56	62	59	74	128	180	184	769
Industry Foresters									
Conservation	*12				*96		*126		----
All other	253				465		627		----
Total	265				561		753		----

(*Years survey conducted)

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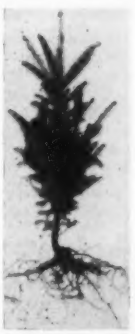

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Forestry News

Forest Service Pest Control Work Consolidated

All control work on forest insects and diseases has been consolidated into one division of the Forest Service, the U. S. Department of Agriculture announces.

This new division of Forest Pest Control will be responsible for activities in controlling insect infestations, disease epidemics, and white pine blister rust control on federal, state, and privately owned forest lands. Warren V. Benedict, formerly in charge of the white pine blister rust control program, will head the new division.

Since most of the work will be done cooperatively with state foresters and other public agencies or private landowners, the division will be under the general supervision of William S. Swingler, assistant chief of the Forest Service in charge of cooperative programs.

Assisting Mr. Benedict will be Conrad P. Wessela, formerly in charge of blister rust control work in the Pacific Northwest Region of the Forest Service, and Russell K. Smith, former supervisor of the Nebraska National Forest at Lincoln, Neb.

Interior to Reorganize Fish and Wildlife Activities

Secretary Fred A. Seaton has announced that action has been initiated to reorganize the fish and wildlife activities of the Department of the Interior to carry out the provisions of the "Fish and Wildlife Act of 1956" which was signed August 8 by the President.

Under the terms of the act, two new top-level posts will be established. One will be an "Assistant Secretary for Fish and Wildlife," and the other will be a "Commissioner of Fish and Wildlife." Appointments to these positions will be made by the President and will be subject to Senate confirmation.

The new assistant secretary position is the first to be created since May 24, 1950 when four assistant secretaries were authorized by Congress. It is the first major reorganization of the Fish and Wildlife Service since 1940 when the Bureau of Biological Survey and the Bureau of Fisheries were combined to form the service.

The act also provides for the creation within the Department of Interior of a new United States Fish and Wildlife Service which will replace the presently existing Fish and Wildlife Service.

The new Service will consist of two separate agencies, each of which will have the status of a federal bureau. One of these agencies will be known as the "Bureau of Commercial Fisheries" and the other as the "Bureau of Sport Fisheries and Wildlife." Each bureau will be headed by a director who will be appointed by the Secretary of the Interior.

Both directors will handle their responsibilities under the direction of the Commissioner who, in turn, will be

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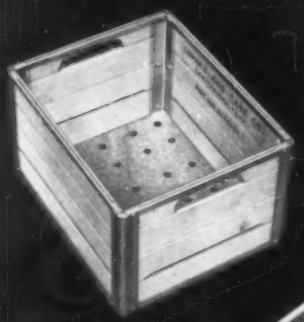

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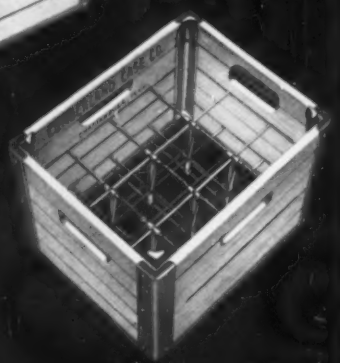

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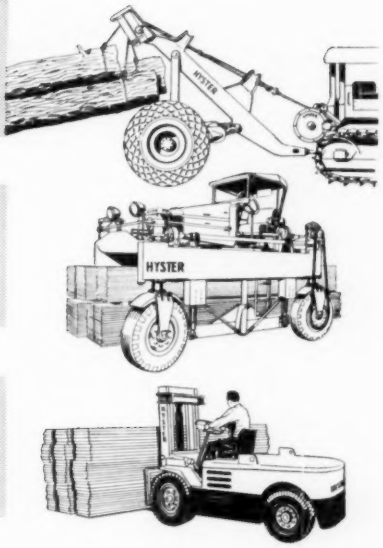

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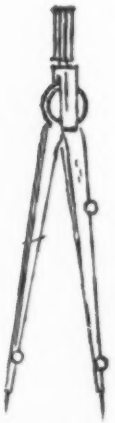

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The Bureau of Commercial Fisheries will be responsible for all functions of the Service pertaining to commercial fisheries, whales, fur seals, sea-lions, and related matters.

A.F.A. Launches Landownership Study in California

The American Forestry Association, aided by a grant from the Nutrilite Foundation, a California organization, has initiated a preliminary study of the ownership pattern of forest, range, watershed, and other conservation lands in the state of California. This study is an outgrowth of A.F.A.'s Fourth American Forest Congress in 1953 which recommended the establishment of a Joint Congressional Committee to study the landownership pattern on a national basis along with simultaneous studies of their own situation by the various states "with a view to promoting state action and correlating consideration of the problem by federal and state agencies." Similar studies are planned for Michi-

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It will take a good bit longer before the young Douglas fir comes of age, but we're counting on it, nonetheless.

At the 200,000-acre Tree Life Tree Farm, near Mount Rainier, this whole generation of trees will be logged in about 80 years.

By that time, Chris's grandson should be with us to help log, process or market the benefits of this generation-to-generation planning. If he is, we're sure he, too, will help perpetuate his forest products inheritance through tree farming—thereby insuring future timber harvests for still future products and payrolls.

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gan and North Carolina with the intent of establishing guide lines for other states.

The California Forest Landownership Study Committee consists of DeWitt Nelson, chairman, and Samuel T. Dana, chief of study, together with the following individuals representing the indicated subject matter interest: Jay H. Price, federal ownership; George L. Drake, industrial ownership; J. Walter Myers, Jr., small private ownership; Harold G. Wilm, watersheds; Carl D. Shoemaker, wildlife and recreation; Otto J. Wolff, rangelands; Lloyd Partain, industry, and Myron E. Krueger, staff (of the committee).

Frank H. Kaufert Leaves for Korean Advisory Visit

Dr. Frank H. Kaufert, director of the University of Minnesota School of Forestry, has left for a three-month assignment in Korea advising on the rehabilitation of the forestry program of Seoul National University. Dr. Kaufert is one of a number of University personnel to go to the Korean school as part of a three-year cooperative project in which the American university is aiding the rebuilding of the Seoul institution after destruction in the Korean war.

The forestry teaching program will receive much of Dr. Kaufert's time. Major attention will also be given to the research program, especially in forest products.

Dr. Kaufert will return to this country at about the end of November.

Korstian On Sabbatical Leave

Dean Clarence F. Korstian of the Duke University School of Forestry is on sabbatical leave during the current fall semester. He is revising the textbook, "Seeding and Planting in the Practice of Forestry."

Dr. Ellwood S. Harrar is acting dean during Dr. Korstian's absence.

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Wilm Named to I.U.F.R.O. Post

Dr. Harold G. Wilm, associate dean and director of biological sciences and graduate studies at the State University College of Forestry at Syracuse University, has been appointed leader of the Forest Influence Section of the International Union of Forest Research Organizations.

Sir Harry G. Champion of Oxford University, Oxford, England, made the announcement.

Dr. Wilm is also vice-president of the International Association of Scientific Hydrology. He is a past associate editor of the JOURNAL OF FORESTRY.

Woodbridge Metcalf Retires

Woodbridge Metcalf, extension forester for California, who had been with the University of California for nearly 42 years, recently retired with the title Extension Forester Emeritus.

A Member of the Society of American Foresters since 1915, Mr. Metcalf was elected a Fellow in 1953. He is currently president of the California Conservation Council, an agency promoting conservation education throughout the state.

He has been succeeded as extension forester by Ed E. Gilden.

James F. Dubuar to Retire from New York State Ranger School

The coming retirement of James F. Dubuar, director of the New York State Ranger school at Wanakena, N. Y., has been announced. The Ranger School is a division of the State University College of Forestry at Syracuse University.

During the 35 years Dubuar served as director, the school developed a 250,000 tree-capacity nursery, established weather stations, and made improvements in its water supply, forest roads, and timber stands.

After working for two years with the Forest Service, 1915-17, he served for a period in the Army. In 1919 he joined the Ranger school faculty as an assistant professor and became director two years later.

Dubuar received his A.B. degree in 1913 and M.S.F. degree in 1915, both

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from the University of Michigan.

He is a Member of the Society of American Foresters and a Fellow in the American Association for the Advancement of Science.

Lucian P. Plumley, assistant to Dr. Hardy L. Shirley, dean of the State University College of Forestry at Syracuse, has been named to succeed Dubuar.

In the August 1955 issue of the JOURNAL, "We Present" dealt with the career of Dubuar.

Frances Flick Leaves Agriculture Library

Frances J. Flick resigned as special bibliographer in forestry from the Library of the U. S. Department of Agriculture, Washington, D. C. She has set up a special information service for the Bureau of Labor and Management at the State University of Iowa, Iowa City.

Miss Flick, a forestry graduate of Iowa State College in 1939, subsequently obtained a B.S. degree in library science at Syracuse University. She has been with the Department of Agriculture library since 1947.

She has been a frequent contributor to the JOURNAL OF FORESTRY, and has helped compile the JOURNAL'S monthly page, Current Literature. Her article, "Applying the Oxford System in America," in the June 1956 issue was based on a special assignment to Oxford University. It describes the application of this decimal classification to collections of forestry literature, photographs, maps, and office files.

Educational Grant Commemorates Colonel Greeley

The Industrial Forestry Association, Portland, Ore., has established two scholarships-lectureships in honor of the late Colonel Greeley. To be called the "Colonel W. B. Greeley Scholarship or Lectureship in Industrial Forestry," they will be established at the College of Forestry, University of Washington and the School of Forestry, Oregon State College. A $1,000 per year sum will be made available each year to each school for a five year period beginning in 1956. The annual sum may be used either for a scholarship or a lectureship at the discretion of the school.

Nils B. Hult, president of the association, in announcing these grants, pointed out the apparent current shortage of trained foresters and Colonel Greeley's particular interest in young men.

Virgin Islands to Have New National Park

Plans are under way for the 29th national park in the National Park

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System of the United States to be established in the Virgin Islands. The park will include approximately 10,000 acres on the island of St. John.

The setting chosen offers scenic interest and unusual plant and animal life as well as recreational possibilities which include sport fishing. In addition the park will be a place of historic interest, with relics of the prehistoric Carib Indians who once lived on St. John Island and remnants of sugar mills and plantation structures of the early historic period.

L. A. Garrison Appointed Yellowstone Superintendent

Lemuel A. Garrison, for the past two years chief of the National Park Service's Branch of Conservation and Protection in Washington, D. C., has been named superintendent of Yellowstone National Park. He succeeds Edmund B. Rogers who has held that position for more than 20 years.

Garrison first joined the Park Service in 1932 following graduation from Stanford University. He has subsequently held positions of increasing importance with that organization as ranger, district ranger, assistant superintendent on varying assignments and as assistant chief of information for the Service.

He is the author of numerous articles which have appeared in *American Forests, Desert Magazine, Arizona Highways*, and other magazines. He is a member of the S.A.F.

Record Timber Harvest from National Forests

A new high of almost 7 billion board feet of timber was harvested from national forests during the year ending June 30, 1956, according to the U. S. Department of Agriculture.

Forest Service field offices reported a cut of 6,907,041,000 board feet of timber between July 1, 1955 and June 30, 1956. This compares to the 6,328,229,000 board feet cut July 1, 1954 to

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June 30, 1955, the previous record year.

The value of the cut in the past year was $97,619,518, an increase of more than $26,000,000 over the value of the cut in the preceding year.

P. F. Graves Named Department Chairman

Dr. Paul F. Graves, associate professor of forest administration at the State University of New York College of Forestry at Syracuse University, has been promoted to full professor and chairman of the Department of Forest Management, according to an announcement from the College.

As new department chairman, Dr. Graves succeeds professor Harold C. Belyea, who retires after 39 years of service at the College.

Graves attended the College of Forestry and graduated in June 1939. He received an M.F. degree from there in June 1941, and a Ph.D. from Syracuse University in June 1950.

Dr. Graves for some time served with the U. S. Soil Conservation Service, with headquarters in Washington, D. C. Later, he transferred to the Office of Personnel in the U. S. Department of Agriculture. He has also served in the U. S. Forest Service, first as a staff assistant, and later as district forest ranger in Illinois.

Dr. Graves is the author of the bulletin "Morale in Public Forestry Organization Employees," based on a special study made at the College of Forestry. He joined the faculty of the College in 1947.

Verrall Heads Southern Disease Research

Dr. Arthur F. Verrall has been named chief of the Southern Forest Experiment Station's newly formed Division of Forest Disease Research, Philip A. Briegleb, Station director, has announced. Dr. Verrall was formerly in charge of the Station's Wood Products and Tree Disease Laboratory in Gulfport, Miss.

The new division chief will be replaced at Gulfport by Paul C. Lightle. Dr. Lightle is being transferred from Placerville, Calif. where he has been conducting research in tree disease.

Dr. Verrall will guide the Station's research on disease of forest trees and decay and stain in forest products. Much of this research is done at the Gulfport laboratory, Briegleb said, but some is carried on at other research centers in various states of the mid-South.

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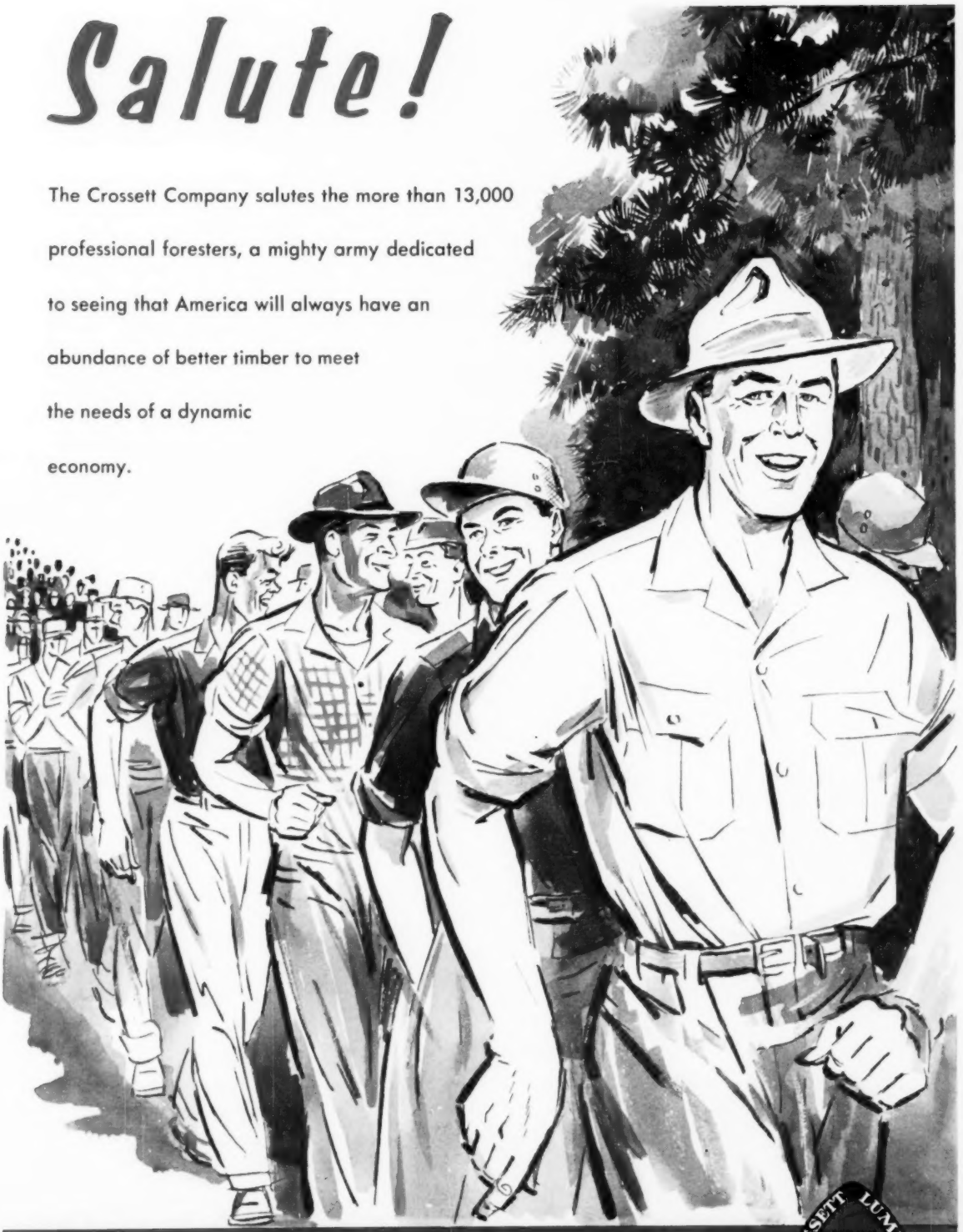

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